

**Three Decades and Counting:  
A Historical Review and Current Assessment of  
Electric Utility Energy Efficiency Activity in the States**

**Dan York, Patti Witte, Seth Nowak, and Marty Kushler**

**June 2012**

**Report Number U123**



## CONTENTS

|  |     |
|--|-----|
| Acknowledgments .....  | ii  |
| Executive Summary .....  | iii |
| Background: The Development of Energy Efficiency as a Resource .....                                   | 1   |
| Objectives and Scope.....  | 2   |
| History and Overall Trends of Electric Utility-Sector Energy Efficiency Programs .....                 | 2   |
| 1980s and 1990s: The Rise and Fall of Demand-Side Management .....                                     | 3   |
| 2000–2004: Rebuilding and Development of New Funding and Program Structures for Energy Efficiency..... | 5   |
| 2005–2009: Firming Up Foundations and Adding New Policy Tools.....                                     | 11  |
| 2010 and Beyond: Rapid Expansion, New Drivers, New Players, and New Challenges ..                      | 15  |
| Measurement of Energy Efficiency as a Resource .....   | 19  |
| Data Sources .....   | 20  |
| Data Difficulties and Limitations.....   | 22  |
| Data Sources .....   | 24  |
| Emerging Issues, Trends, and Outlook for Utility-Sector Energy Efficiency Programs .....               | 26  |
| Raising the Bar with Energy Efficiency Resource Standards .....  | 26  |
| Trends to Watch .....  | 28  |
| New Business Models and Technologies as Change Agents for Energy Utilities.....                        | 29  |
| Smart Grid and Behavior Change: New Tools and Approaches for Energy Efficiency .....                   | 30  |
| Challenges and Barriers .....  | 30  |
| Workforce .....  | 30  |
| Measurement of Impacts .....   | 31  |
| Reduced Energy Efficiency Opportunities for Energy Efficiency Programs? .....                          | 32  |
| Other Drivers of Demand Growth .....   | 32  |
| Sustaining Savings .....   | 32  |
| Conclusions and Recommendations: A New Era of Energy Efficiency as a Resource.....                     | 32  |
| References.....  | 35  |

## **ACKNOWLEDGMENTS**

ACEEE thanks the Energy Foundation, the Kresge Foundation, and a foundation that wishes to remain anonymous for funding this research. Their support made this work possible.

ACEEE also thanks the following colleagues who reviewed the report and provided valuable feedback: Ralph Cavanagh of the Natural Resources Defense Council; Adam Cooper of the Institute for Electric Efficiency; Hilary Forster of the Consortium for Energy Efficiency; and Rich Sedano of the Regulatory Assistance Project.

Finally, the authors thank Renee Nida for editing and producing the final report.

## EXECUTIVE SUMMARY

Customer energy efficiency programs provided by electric utilities have existed in some form for 30 years or more in some areas. The programs arose in the 1970 largely in response to the energy crises that occurred during that time. These early programs emphasized energy conservation as a response to these crises. In the 1980s, utility energy efficiency programs grew rapidly and became widespread as part of the practice of utility demand-side management (DSM). DSM marked a fundamental shift in utility planning and operation. No longer was customer electric demand treated as a variable outside the reach of utility influence or control; rather, such demand was now viewed as something that could be influenced and even managed by utilities to meet their needs and those of their customers. Energy efficiency became an energy resource within utility resource portfolios.

By the 1990s, DSM was well established. In 2000, the American Council for an Energy-Efficient Economy (ACEEE) provided one of the first comprehensive assessments of the size and status of DSM. ACEEE's *2000 Utilities Scorecard* captured the rapid growth, and then decline, of utility DSM. In 1993, spending on such programs was nearly \$2 billion—a significant number considering the majority of utility DSM programs were initiated in the mid-to late-1980s. Such robust growth turned around beginning in the mid-1990s with the advent of state-level efforts to restructure and deregulate electric utility markets. These industry upheavals led to a precipitous decline in utility customer energy efficiency programs as a variety of factors associated with industry restructuring and regulatory frameworks changed utility business models and energy markets. Funding for electric energy efficiency programs plummeted from almost \$1.8 billion in 1993 to about \$900 million in 1998. Spending on customer energy efficiency programs averaged 0.4% of utility revenues from electric sales in 1998, with some states essentially at zero (no significant spending) and Massachusetts leading by this metric at 1.9%.

The decline in funding for customer energy efficiency programs stemming from industry restructuring led some states to establish new funding mechanisms for these programs, most commonly “public benefits charges.” These charges consist of a small non-bypassable per kilowatt-hour charge on the electric distribution service established through state legislation. Some states also created new institutional structures for administering and providing programs. In some cases new organizations were created to fulfill this function and in other cases existing organizations were given this responsibility. These new funding mechanisms and institutional structures arose because these states recognized the benefits in offering customer energy efficiency programs regardless of the structure of electric utility markets.

Funding for customer energy efficiency programs began to rebound from the apparent low point reached in 1998. Total spending (utility-reported DSM combined with public benefits spending) increased modestly—from \$918 million in 1998 to \$1.10 billion in 2000. Much of this increase was from public benefits funding, which increased rapidly and became a large share (approximately 66%) of total funding for energy efficiency programs. Most states that had been actively engaged in providing energy efficiency services continued to fund and implement energy efficiency programs, although the funding mechanisms, the particular purpose and structure of programs, and the regulatory environment in which the programs were offered in many cases were different and changing. The states most actively providing publicly supported energy efficiency programs continued to be primarily in the Northeast (including New England and the Mid-Atlantic region), the Pacific Northwest, and certain

parts of the Midwest, as well as the states of Florida and California. A number of states were notable for increasing their commitment to energy efficiency from the late-1990s.

There was great variability in funding levels for energy efficiency programs. In 2000, about one-third of the states (16) accounted for 86% of total U.S. spending on energy efficiency programs. One-half of the states (25) accounted for essentially all (95%) of total spending on efficiency programs. Even within this top half of states, there was great variability, as the spending per capita ranged from \$1.16 to \$19.48—a factor of about 17 from lowest to highest.

The story of growth and rebound for utility customer energy efficiency programs continued through the early 2000s. In 2003, nationwide spending on customer electric energy efficiency programs increased to approximately \$1.35 billion. Utility customer energy efficiency programs entered an era of renewed focus and importance after a decade of relative neglect in the wake of electric industry restructuring. This renewal was driven by a combination of factors, including dramatic increases in fossil fuel prices, significant concerns with natural gas prices and availability, and growing concern over electric system capacity. Another key driver was the recognition of the reliability benefits of energy efficiency, demonstrated most clearly in California during its 2000–2001 energy crisis.

Analysis of 2003 data showed clearly that energy efficiency funding remained heavily concentrated in a relatively small proportion of states. The spending of the top twenty states (as measured by spending per capita) accounted for 90% of nationwide spending on energy efficiency programs. While the observed rebound of state-level spending and associated program activity continued, some of these gains were clouded by the state government budget crises in the early 2000s in many states, which resulted in some program funding reductions. These budget "raids" dampened the rate of overall increase and clearly had significant impacts on the programs in affected states.

In 2004, spending on customer electric energy efficiency programs had reached \$1.45 billion. Funding and support for programs appeared more secure and stable than the prior few years. Such spending on programs continued to show wide variation among states. Nationally, the average electric energy efficiency spending per capita in 2004 was \$4.93, with a range of zero to \$22.54 and a median of \$1.64. A total of 10 states spent more than \$10 per capita on customer electric energy efficiency programs; a total of 17 states spent \$5 or more per capita. The top twenty states (in terms of their spending per capita) accounted for 88% of nationwide spending on electric energy efficiency programs. The top ten states accounted for 63% of total national spending.

Funding for customer energy efficiency programs has continued to grow at an accelerated rate since the early to mid-2000s. In 2006, total spending was \$1.6 billion; in 2007 this reached \$2.2 billion and in 2008 this grew to \$2.6 billion. In the span of a decade, spending had increased more than threefold. By 2010, total budgets for electric customer energy efficiency programs leaped to \$4.6 billion. Such significant expenditures are yielding significant energy savings. In 2009, the national total annual savings from customer energy efficiency programs were 13,147 TWh or almost 0.4% of total energy sales. In 2009, five states saved 1.0% or greater.

Primary drivers of this growth in spending on customer energy efficiency programs and corresponding savings have been “energy efficiency resource standards” (EERS), which are

quantified, annual, and long-term energy savings targets for states and sometimes other jurisdictions such as regions or utilities. Under this policy, utilities must procure a percentage of their future electricity needs using energy efficiency measures, typically equal to a specific percentage of their projected load. Energy savings are then achieved through end-user efficiency programs run by utilities or other third-party programs. Such policies originated in a few states in the late 1990s and have grown rapidly. There are a total of 25 states that have EERS in place. These policies clearly are helping drive the observed rapid growth of utility and public benefits energy efficiency programs, particularly because the savings targets are high relative to historical savings from programs. Most EERS savings targets, usually after an initial ramp-up, reach 1–2% or higher.

The concept and practice of “energy efficiency as a resource” has come a long way in a relatively short time. While the scope and magnitude of such programs have fluctuated over the years, since the mid-2000s the growth and expansion of customer energy efficiency programs have greatly accelerated—resulting in unprecedented levels of spending on these programs and corresponding energy savings.

The record of achievement from utility and public benefits energy efficiency programs clearly demonstrates the real value of these programs. Energy efficiency remains the lowest cost resource available within energy portfolios. With its significant environmental benefits, it is clearly the preferred energy resource among all options. Over thirty years of experience with customer energy efficiency programs has laid an important foundation for a new era of such programs—an era that will be marked by innovation and expansion.



## **BACKGROUND: THE DEVELOPMENT OF ENERGY EFFICIENCY AS A RESOURCE**

At the dawn of the 21<sup>st</sup> century, a time marked by great anticipation for a new century of unimaginable technological advances, it was with great irony that perhaps the state known as a beacon of high technology and the new economy was facing a crisis of a decidedly early 20<sup>th</sup> century nature: looming blackouts from an electricity supply system on the brink of collapse. California faced an electricity crisis in 2000-2001 that was brought on largely by a failed effort to restructure and deregulate the electric utility industry. As it turned out, energy efficiency<sup>1</sup> and related demand-side responses by customers literally kept the lights on during the crisis (Kushler and Vine 2003). In the end, despite initial forecasts of multiple likely rolling outages ("blackouts"), California weathered this crisis and managed to keep its economy humming and the electricity flowing. California's electricity crisis illustrated the complex nature of our energy supply systems and the interplay of market forces, public policy, and regulation, as well as our collective ability to control them with the right mix of coordination and shared motivation.

The role that energy efficiency played during this crisis illustrates how energy efficiency as achieved through utility-sector energy efficiency programs<sup>2</sup> has grown, matured, and become a key resource within utility energy resource portfolios.<sup>3</sup> The American Council for an Energy-Efficient Economy (ACEEE) has long recognized this valuable role and has tracked key data and policy developments for utility-sector energy efficiency programs since 1980, the year ACEEE was founded.

The concept that energy utilities should substitute electricity savings in new and existing end-uses for more costly alternative sources of electricity (often through incentives to secure efficiency improvements from sources independent of utilities) was a radical departure from the regulatory and business models established and followed by energy utilities since their inception in the early part of the 20<sup>th</sup> century. These models largely were premised on and designed for constant growth of demand for electricity (and natural gas). The political, economic, and environmental turmoil associated with energy supplies and markets in the 1970s laid the foundation for changing these models of energy utilities.

Some utilities began providing customer energy efficiency programs in the 1970s. In the 1980s, customer energy efficiency programs grew rapidly. By the early 1990s, ACEEE's research showed that electric utilities were spending close to \$2 billion per year on customer electric energy efficiency programs. ACEEE has continued to track and report such data and related policy development for customer energy efficiency programs. Through such tracking, we documented a precipitous fall in such program spending in the late 1990s as numerous states enacted or examined fundamental restructuring of their energy utilities to open up certain aspects of their operation to competitive markets, such as retail sales of energy. Funding support for energy efficiency programs has rebounded significantly, as tracked and

---

<sup>1</sup> ACEEE defines energy efficiency as measures that result in producing the same or better levels of amenity or service (e.g., light, space conditioning, motor drive power, etc.) using less energy. Measures are generally long-lasting and save energy across all periods for which the end-use equipment is in operation.

<sup>2</sup> Throughout the report, we refer to "customer energy efficiency programs" or "utility-sector efficiency programs." These are energy efficiency programs that are funded by utility customers through their utility rates or related "public benefits charges" on utility bills. Others may refer to these programs as "ratepayer-funded energy efficiency programs."

<sup>3</sup> "Energy resource portfolios" are the combined set of options used by utilities to meet customer energy demand, including electric generation plants (fossil fuel, nuclear, and renewable based), purchased power agreements, and an array of "demand-side" resources, such as energy efficiency and load management.

reported by ACEEE and other national organizations, such that by 2010 the total budgets for electric energy efficiency programs were \$4.6 billion (Sciortino, Neubauer et al. 2011).

## Objectives and Scope

This report reviews past efforts and accomplishments of utility-sector energy efficiency programs and provides a comprehensive update and review of current utility-sector policies and programs. Such a review is especially important at a time when there are rapid changes underway greatly increasing the role and importance of these programs in meeting a wide and growing set of economic and environmental objectives. The need for accurate, up-to-date data on customer energy efficiency programs offered by utilities and non-utility organizations has never been greater. In this report, we review and summarize industry trends over the last 20 or more years as documented and reported in earlier ACEEE research. We also examine and discuss important changes, particularly the organization and funding of programs. We update these data through 2010 and closely examine the changing and changed nature of sources of the data with an eye towards evolving and future needs.

## HISTORY AND OVERALL TRENDS OF ELECTRIC UTILITY-SECTOR ENERGY EFFICIENCY PROGRAMS

Customer energy efficiency programs provided by electric utilities have existed in some form for 30 years or more in some areas. The utilities have offered these programs for many reasons, primarily to provide energy cost savings to their residential and business customers, but also to hedge against fuel cost variability, avoid siting and permitting challenges for new generation and transmission, and achieve broader economic and environmental benefits. The emergence and practice of "integrated resource planning" (IRP)—also called "least cost utility planning"—marked a transformation within the utility industry of considering not just supply options (as was traditionally done), but also investments and actions to affect and shape customer demand through the practice of utility "demand-side management" (DSM). IRP and DSM became relatively widespread in the 1980s and 1990s, and are still in place in numerous states.

ACEEE has published periodic state utility *Scorecard* reports as a means to track national energy efficiency program trends and levels of activity, beginning with *State Scorecard on Utility Energy Efficiency Program Trends*, published in 2000 (Nadel et al. 2000). We have since published two *Scorecards* (York and Kushler 2002, 2005) that included only data on utilities and public benefits<sup>4</sup> energy efficiency programs. Beginning in 2007, ACEEE expanded these *State Scorecards* to encompass a wider spectrum of state-level policies and programs—including transportation, combined heat and power systems, appliance standards, building codes, and state government initiatives.<sup>5</sup> ACEEE has continued to publish these expanded *State Scorecards* annually.

Over the history of both the utilities-only *Scorecards* and expanded *State Scorecards*, we have used various methods to calculate the energy efficiency expenditures and savings data

---

<sup>4</sup> "Public benefits" programs refer to customer energy efficiency and sometimes renewable energy programs funded through "public benefits" fees charged to energy utility customers.

<sup>5</sup> In 2003, ACEEE published a broader review of energy efficiency policies in *Energy Efficiency's Next Generation* (Prindle et al. 2003). That report, however, did not report state rankings on this broader set of efficiency policies.

that were used to assign scorecard values to the states. We've also compiled and tracked other policy and program metrics to assess progress in capturing the economic, environmental and system benefits of improved end-use energy efficiency. Below, we examine the data sources, methodologies, and key findings for the various scorecard reports to provide an overview on our past, current, and future efforts in this area. We've delineated key periods as defined by policy and market changes that affected utility-sector energy efficiency programs. In this way, we also track important policy and program developments that have occurred since energy efficiency first began to be incorporated into utility planning, operations, and customer services.

### **1980s and 1990s: The Rise and Fall of Demand-Side Management**

Some utilities began offering customer energy efficiency programs in the mid-1970s. The earliest stirrings go back to 1975 at the California Public Utilities Commission, where Commissioner Lenny Ross stated in a case addressing the revenue needs of Pacific Gas and Electric:

“We regard conservation as the most important task facing utilities today. Continued growth of energy consumption at the rates we have known in the past would mean even higher rates for customers, multibillion dollar capital requirements for utilities, and unchecked proliferation of power plants . . . Reducing energy growth in an orderly, intelligent manner is the only long-term solution to the energy crisis.” (Cavanagh 2009)

By the late 1970s, utility customer energy efficiency programs were offered by a number of electric utility companies (e.g., PG&E, Pacific Power & Light, and Portland General Electric).

The 1980s marked the rapid growth of the practice of utility DSM across the United States (and numerous other countries). Its roots clearly were in the energy crises experienced in the 1970s, when energy issues (and prices) first rose to national and international prominence. DSM marked a fundamental shift in utility planning and operation. No longer was customer electric demand treated as a variable outside the reach of utility influence or control; rather, such demand was now viewed as something that could be influenced and even managed by utilities to meet their needs and those of their customers.

Utility DSM grew rapidly in the 1980s and into the early 1990s. ACEEE provided one of the first comprehensive assessments of the size and status of DSM in its first Scorecard report (Nadel et al. 2000). This report was ACEEE's first effort—and one of the first such efforts—to compare the 50 states and the District of Columbia on electric utility-sector energy efficiency program expenditures and savings using data gathered and reported by the Energy Information Administration's (EIA) *U.S. Electric Utility Demand-Side Management* reports (EIA 1995a, 1999a). These EIA reports contained survey results on electric DSM program expenditures and energy savings<sup>6</sup> from over 1,400 private and public electric

---

<sup>6</sup> Energy savings are based on EIA's definition of annual effects in EIA Form 861 (see <http://www.eia.doe.gov/cneaf/electricity/forms/eia861/eia861instr.pdf>). Annual effects, or cumulative annual savings, are equivalent to the total changes in energy use (measured in gigawatthours) caused in the current reporting year by all participants in all of the states' utilities' energy efficiency programs (excluding load management programs). This includes new and existing participants in programs (those implemented prior to the current reporting year that were in place during the prior reporting year), all participants in new programs (those implemented during current reporting year), and participants in programs terminated since 1992 (those effects

utilities.<sup>7</sup> ACEEE only included EIA Form 861 data on energy efficiency programs, since load management programs (data tracked separately on the EIA 861 forms) primarily result in peak load reduction (reducing peak power demand) and not overall energy savings.

ACEEE used four parameters to calculate one overall score to rank state performance:

1. 1998 energy efficiency expenditures as percentage of utility revenues;
2. 1998 cumulative electricity savings as percentage of electricity sales;
3. change in expenditures as a percentage of revenues between 1993 and 1998; and
4. change in cumulative savings as percentage of sales between 1993 and 1998.

The EIA data used in the 2000 report were based on utility-reported energy efficiency expenditures and savings reported to the EIA. To address some gaps in the data, ACEEE supplemented the EIA database through individual contacts to several utilities and related organizations providing customer energy efficiency programs.

ACEEE's *2000 Utilities Scorecard* captured the rapid growth, and then decline, of utility DSM, specifically programs targeting energy efficiency improvements. Although this was not the first historical fluctuation in customer energy efficiency program spending, it was a significant one. In 1993, spending on such programs was nearly \$2 billion—a significant number considering the majority of utility DSM programs were initiated in the mid- to late-1980s. Such robust growth turned around beginning in the mid-1990s with the advent of state-level efforts to restructure and deregulate electric utility markets. These state-level restructuring discussions began in Texas, New Mexico, Rhode Island, Nevada, and Michigan (Cavanagh 1994). California electric utilities were restructured in 1996. Other states followed by restructuring their electric utility industries to introduce competition at both the retail and wholesale levels.

An apparent victim of electric industry restructuring was customer energy efficiency and other DSM programs. The model of regulatory and utility resource planning with utility customer programs to pursue energy efficiency and other demand-side objectives did not fit well with the philosophy of relying upon competitive retail and wholesale energy markets to make decisions about electric resources. In addition to the utilities' perceived need to shed "extraneous costs" in order to minimize average rates in a "competitive" market, program funding decreased due to the uncertainty and associated risk of the restructured markets and the fear of lost regulatory support for utility energy efficiency programs. This included the reduction or loss of cost recovery mechanisms for energy efficiency and DSM programs. At the time, most utilities were not purely expensing energy efficiency costs. Utilities were generally recovering program-related costs and lost revenues over three to five years. With the prospect of retail competition, utilities were concerned about operating the programs under a traditional regulatory cost recovery model that expensed the costs over a longer period. As a result of these multiple factors, funding for customer electric energy efficiency programs plummeted from almost \$1.8 billion in 1993 to about \$900 million in 1998.

Some states, however, recognized the benefits in offering energy efficiency programs to consumers and created new mechanisms to provide program funding. The most common

---

continue even though the programs have been discontinued). Cumulative annual energy efficiency savings are the total energy efficiency program effects of all programs and all participants for the current reporting year.

<sup>7</sup> The annual 861 data survey by EIA relies on voluntary reporting by the utilities; the data are self-reported by responding utilities and EIA does not verify the data for accuracy.

alternative funding mechanism to embedding costs in rates is a “public benefits charge,”<sup>8</sup> which consists of a small non-by-passable per kilowatt-hour (kWh) charge on the electric distribution service established through state legislation. The core rationale to creating public benefits charges was that even though we were moving away from the use of energy efficiency as a utility system “resource,” and in many states consumers might be choosing their energy supplier, there were other important “public benefits” that were worth maintaining. The development of these “public benefit charge” policies in a number of leading states helped sustain utility customer energy efficiency programs during a period of overall dramatic decline by assuring a revenue stream that regulators could track. Despite these policies, however, overall spending on utility sector energy efficiency programs still plunged by 50% from 1993 to 1998.

Energy efficiency expenditures in 1998 ranged from a high of 1.9% of revenues in Massachusetts to a low of nearly zero in Kansas, Nevada, and West Virginia. On average, nationwide efficiency expenditures were 0.42% of utility revenues from electric sales.

Cumulative annual energy savings due to electric energy efficiency programs in 1998 ranged from a high of 9.2% of electricity sales in Washington State to a low of nearly zero in Kansas. The national average was 1.7% of electricity sales.

The overall state rankings from the 2000 report are listed in Table 1.

**Table 1. Highest and Lowest Ranked States in 1998**

| Top Ten (in order) | Bottom Ten (in order) |
|--------------------|-----------------------|
| 1. Washington      | 51. West Virginia     |
| 2. New Jersey      | 50. Alabama           |
| 3. Rhode Island    | 49. Nevada            |
| 4. Massachusetts   | 48. Tennessee         |
| 5. Minnesota       | 47. Arizona           |
| 6. Oregon          | 46. Michigan          |
| 7. Iowa            | 45. Pennsylvania      |
| 8. Wisconsin       | 44. Georgia           |
| 9. Hawaii          | 43. Nebraska          |
| 10. Vermont        | 42. Kansas            |

**2000–2004: Rebuilding and Development of New Funding and Program Structures for Energy Efficiency**

In 2002, ACEEE published an update to its initial state scorecard (York and Kushler 2002). The update included electric utility-sector energy efficiency program data through 2000. As in the previous scorecard report, the primary source of utility energy efficiency data for the 2002 update was the Energy Information Administration. The 2002 update, like the 2000 report, focused on energy efficiency spending and savings since other programs such as the load management programs primarily result in peak load reduction and not overall energy savings. A secondary source of data was the Edison Electric Institute (EEI), which provided state breakdowns of utility electricity sales and revenue data for utilities serving multiple

<sup>8</sup> The term “public benefits charge” and “system benefits charge” are interchangeable. Both terms underscore the point that energy efficiency programs delivered public or system-wide benefits for electricity and natural gas users.

states (EEI 2002). ACEEE again supplemented these primary data sources with personal contacts and other data sources, such as program annual reports or regulatory filings.

ACEEE did not replicate the scoring scheme used in the 2000 scorecard to develop a single score and associated ranking of states. Rather, in the 2002 update, ACEEE compiled and reported key data and then ranked the states according to each of those indicators of energy efficiency program activity, namely:

1. Energy efficiency expenditures as a percentage of utility revenues;
2. Energy efficiency expenditures per capita; and
3. Cumulative electricity savings as a percentage of electricity sales.

Similar to the 2000 report, the 2002 scorecard included some public benefits programs that were not within the domain of utilities and therefore were not reported to the EIA. To address these data gaps and check on data accuracy in some cases, ACEEE contacted selected utility or state regulatory or administrative staff, or relied on published program documents.

The 2002 update found that electric utility-sector energy efficiency programs were rebounding from what seemed like a low point reached in the late 1990s as reported in the first Scorecard report. Total spending (utility-reported DSM combined with public benefits spending) increased modestly since 1998—from \$918 million to \$1.10 billion in 2000. Much of this increase was from public benefits funding, which increased rapidly and became a large share (approximately 66%) of total funding for energy efficiency programs. Such spending was expected to continue to increase, as indicated by the total amount of funding authorized by states enacting such programs. Public benefits spending in 2000, in many states, was not fully “ramped up” to the full amounts of authorized budgets.

Generally, most states that had been actively engaged in providing energy efficiency services continued to fund and implement energy efficiency programs, although the funding mechanisms, the particular purpose and structure of programs, and the regulatory environment in which the programs were offered in many cases were different and changing. The states most actively providing publicly supported energy efficiency programs continued to be primarily in the Northeast (including New England and the Mid-Atlantic region), the Pacific Northwest, and certain parts of the Midwest, as well as the states of Florida and California.

A number of states were notable for increasing their commitment to energy efficiency from the late 1990s, although in most of these cases (New York, Wisconsin, Texas, and Vermont), spending levels in 2000 were still lower than 1993. A few states (notably Connecticut and New Jersey) increased spending from the late 1990s and also were at higher levels than they were in 1993.

There was great variability in funding levels for energy efficiency programs. About one-third of the states (16) accounted for 86% of total U.S. spending on energy efficiency programs. One-half of the states (25) accounted for essentially all (95%) of total spending on efficiency programs. Even within this top half of states, there was great variability, as the spending per capita ranged from \$1.16 to \$19.48—a factor of about 17 from lowest to highest.

Table 2 lists the states with the highest and lowest spending on energy efficiency programs per capita in 2000, according to the 2002 report:

**Table 2. Highest and Lowest Energy Efficiency Spending per Capita in 2000**

| Top Ten (in order) | Bottom Ten (in order) |
|--------------------|-----------------------|
| 1. Connecticut     | 51. Virginia          |
| 2. Massachusetts   | 50. Kansas            |
| 3. Rhode Island    | 49. North Carolina    |
| 4. New Jersey      | 48. Louisiana         |
| 5. Vermont         | 47. Nebraska          |
| 6. Maine           | 46. Arkansas          |
| 7. Wisconsin       | 45. Alabama           |
| 8. Hawaii          | 44. Mississippi       |
| 9. New York        | 43. Oklahoma          |
| 10. California     | 42. Missouri          |

In 2005, ACEEE published its 3<sup>rd</sup> Scorecard consisting of only utility-sector program data (York and Kushler 2005). As in the 2000 and 2002 scorecard reports, the primary data source for the 2005 scorecard report was the Energy Information Administration (EIA 2005). This report used data through 2003, reflecting the inherent lag that exists for the data collection and reporting efforts of EIA and utilities nationwide. As in earlier reports, ACEEE supplemented the EIA dataset with other sources. For this 3<sup>rd</sup> Scorecard report, ACEEE drew upon research completed for a report on state public benefits programs (Kushler, York, and Witte 2004) for much of the non-utility data. ACEEE also obtained data from a number of individual state references.

In this 3<sup>rd</sup> Scorecard update, ACEEE compiled and reported key data through 2003 and then ranked states according to the same derived energy efficiency program indicators as the 2<sup>nd</sup> Scorecard ("Update") report:

1. Energy efficiency expenditures as a percentage of utility revenues;
2. Energy efficiency expenditures per capita; and
3. Cumulative electricity savings as a percentage of electricity sales.

In this 3<sup>rd</sup> Scorecard, there was an increase in the number of state-level utility customer public benefits programs. Although some of these programs were administered by the utility companies themselves, public benefit programs were administered by non-utility entities in several states, including Wisconsin, Vermont, New York, Oregon, and New Jersey. This meant that ACEEE had to rely on data reported by a larger number of non-utility organizations.

Total funding nationwide for customer electric energy efficiency programs—both utility DSM and public benefits programs (non-utility and utility administered)—continued a modest rebound since reaching an apparent low point in the late 1990s. In 2003, nationwide spending on customer electric energy efficiency programs increased to approximately \$1.35 billion. ACEEE believed this upward trend would continue as states such as California increased their commitment to supporting energy efficiency programs as part of a long-term energy resource plan. Other states and regions across the country were looking to increase energy efficiency as part of their energy, economic, and environmental strategies. The Northwest's fifth regional energy plan called for meeting all demand growth through energy efficiency (NPCC 2005). Another example was the Western Governors Association's "Clean and Diversified Energy Initiative" that was examining efforts to increase the efficiency of

energy use by 20% by 2020 (WGA 2005). Further, several Western states, Nevada, Utah and Colorado, showed relatively large increases in program funding from 2000–2003.

Table 3 lists the states with the highest and lowest spending on utility sector electric energy efficiency programs per capita in 2003, according to the 2005 report:

**Table 3. Highest and Lowest Energy Efficiency Spending per Capita in 2003**

| Top Ten (in order) | Bottom Ten (in order)    |
|--------------------|--------------------------|
| 1. Vermont         | 51. Wyoming              |
| 2. Massachusetts   | 50. Virginia             |
| 3. New Hampshire   | 49. Delaware             |
| 4. Washington      | 48. Kansas               |
| 5. Rhode Island    | 47. District of Columbia |
| 6. Oregon          | 46. North Carolina       |
| 7. Wisconsin       | 45. Nebraska             |
| 8. New Jersey      | 44. Maryland             |
| 9. Montana         | 43. Missouri             |
| 10. Iowa           | 42. Oklahoma             |

Utility customer energy efficiency programs entered an era of renewed focus and importance after a decade of relative neglect in the wake of electric industry restructuring. This renewal was driven by a combination of factors, including: dramatic increases in fossil fuel prices; significant concerns with natural gas prices and availability; growing concern over electric system capacity; and the emerging recognition of financial risks associated with future environmental costs and energy independence for federal security initiatives. Another key driver was the recognition of the reliability benefits of energy efficiency, demonstrated most clearly in California during its 2000–2001 energy crisis.

As ACEEE observed in earlier scorecard reports, it was clear that energy efficiency funding remained heavily concentrated in a relatively small proportion of states. The spending of the top twenty states (as measured by spending per capita) accounted for 90% of nationwide spending on energy efficiency programs.

While the observed rebound of state-level spending and associated program activity continued, some of these gains were clouded by the state government budget crises in the early 2000s in many states, which resulted in some program funding reductions. These budget "raids" dampened the rate of overall increase and clearly had significant impacts on the programs in affected states. For example, in 2002, the Connecticut public benefits energy efficiency fund experienced a raid of \$12 million (out of a total energy efficiency public benefits fund of approximately \$85 million/year) to transfer money to the state budget (presumably to use on state facilities). In Wisconsin, there was a major raid on the public benefits programs to take funds to help with the state budget deficit. Approximately \$18 million was taken for 2003 and \$29 million for 2004 (nearly half of the \$62 million annual budget for public benefits energy efficiency).

Setbacks such as these budget raids highlighted the importance of stable, strong support for customer programs to achieve greater energy efficiency. However, such programs alone will not achieve the full potential for energy efficiency throughout the economy. In recognition of the need for multiple policy initiatives to advance energy efficiency, ACEEE initiated a fundamentally new State Scorecard in 2007. This new State Scorecard incorporated

multiple policy categories and greatly expanded the metrics by which to assess state progress in each category (Eldridge et al. 2007). This new ranking system was based on state progress in eight energy policy categories:

1. Spending on Electric Utility and Public Benefits Energy Efficiency Programs in 2004
2. Energy Efficiency Resource Standards
3. Combined Heat and Power
4. Building Energy Codes
5. Transportation Policies
6. Appliance and Equipment Efficiency Standards
7. Tax Incentives
8. State Leading by Example and Research and Development.

Policies affecting energy efficiency programs administered by utilities or non-utility organizations comprised a significant proportion of total scoring under this new scheme. Spending on electric energy efficiency programs accounted for 15 of a total 44 points; energy efficiency resource standards accounted for 5 of 44 points. In total then, 20 out of 44 maximum points were assigned to metrics associated with utility-sector energy efficiency policies and programs.

The 2007 Scorecard introduced a scoring metric for energy efficiency resource standards (EERS). EERS are quantified, annual, and long-term energy savings targets for states and sometimes other jurisdictions such as regions or utilities. Under this policy, utilities must procure a percentage of their future electricity needs using energy efficiency measures, typically equal to a specific percentage of their projected load. Energy savings are then achieved through end-user efficiency programs run by utilities or other third-party program.

As with the earlier utilities-only Scorecard reports, the primary source of electric utility data for this expanded State Scorecard was the Energy Information Administration (EIA 2005). ACEEE also gathered data from individual states as needed, given the rise of non-utility energy efficiency programs (primarily public benefits programs). The 2007 report relied on utility sector and public benefits energy efficiency data from 2004.<sup>9</sup>

ACEEE's tracking and reporting of utility-sector energy efficiency programs continued to include only electric program data although state spending on natural gas efficiency programs and state natural gas savings data are also key indicators of state performance in the energy efficiency industry. ACEEE hoped to include natural gas data in this expanded State Scorecard. However, these data were not tracked or included due to lack of adequate data.

In the mid-2000s, as revealed in this expanded State Scorecard, utility-sector energy efficiency programs continued the upward trend in activity, as documented by such metrics as program spending and savings. By this time, most of the states that had restructured their energy markets saw the continued value of and need for customer energy efficiency programs. A number of reliability problems with electricity grids and associated supply systems also pinpointed improved energy efficiency as a valuable strategy to reduce system loads and maintain system integrity. New focus on the environmental benefits of energy

---

<sup>9</sup> EIA data for 2004 was released in November 2005. Data for 2005 was released in November 2006 and therefore did not allow enough time to synthesize and collect additional state-by-state data.

efficiency, especially for being a highly cost-effective means to reduce greenhouse gas emissions, also helped drive new and renewed interest in utility-sector energy efficiency.

In response to these lessons and new policy drivers, utility customer energy efficiency programs entered a new era of renewed focus and importance. Funding support for energy efficiency programs continued to increase, although perhaps more modestly. ACEEE found that total spending on customer electric energy efficiency programs had reached \$1.45 billion for 2004; all indicators suggested that the upward trend was continuing (York and Kushler 2006). Funding and support for programs appeared more secure and stable.

The structure and delivery of utility customer energy efficiency experienced some changes from the 1980s into the 1990s and early 2000s, mostly in conjunction with restructuring efforts. In the 1980s and 1990s, such programs were almost the exclusive domain of utilities. They administered and implemented programs under regulatory oversight. With the advent of restructuring, however, a number of states (New York, Wisconsin, Vermont, Oregon, Maine, Delaware, and New Jersey) enacted public benefits energy programs that established new structures and tasked new organizations with the responsibility of administering and delivering energy efficiency and related customer energy programs (including low-income energy programs and renewable energy programs in some cases). Not all public benefits programs were administered or delivered by non-utility organizations, however. In many states, there was a public benefits funding mechanism that went to the utilities to administer and implement the programs. By the mid-2000s, the administrative structures and funding mechanisms for utility-sector energy efficiency programs had generally been well established. States now seemed reasonably content to work with the administrative structures and funding mechanisms they had; they now were able to focus better on program results and improvements

In the 2007 Scorecard, we scored 2004 state spending on utility-sector and public benefits electric energy efficiency programs based on spending per capita. Nationally, the average electric energy efficiency spending per capita in 2004 was \$4.93, with a range of zero to \$22.54 and a median of \$1.64. A total of 10 states spent more than \$10 per capita on customer electric energy efficiency programs; a total of 17 states spent \$5 or more per capita. The top twenty states (in terms of their spending per capita) account for 88% of nationwide spending on electric energy efficiency programs. The top ten states account for 63% of total national spending; adding the next five (the top 15) brings this up to 80%. These top states also represent a relatively large share of population, which improves this picture in terms of spending relative to population.

The top and bottom ten states based on 2004 per capita utility-sector and public benefits electric energy efficiency spending are listed in Table 4, as given in the *2007 State Scorecard*.

**Table 4. Highest and Lowest Energy Efficiency Spending per Capita in 2004**

| Top Ten (in order) | Bottom Ten (in order) |
|--------------------|-----------------------|
| 1. Vermont         | 51. Delaware          |
| 2. Massachusetts   | 50. Wyoming           |
| 3. Oregon          | 49. Virginia          |
| 4. Connecticut     | 48. Kansas            |
| 5. Washington      | 47. Maryland          |
| 6. Rhode Island    | 46. Louisiana         |
| 7. New Hampshire   | 45. Arkansas          |
| 8. Minnesota       | 44. Oklahoma          |
| 9. New Jersey      | 43. Alabama           |
| 10. California     | 42. Georgia           |

### 2005–2009: Firming Up Foundations and Adding New Policy Tools

*The 2008 State Energy Efficiency Scorecard* was ACEEE’s second report that ranked states on a comprehensive list of energy efficiency policies (Eldridge et al. 2008). The eight categories used in the 2008 Scorecard differed somewhat from the list used in the 2007 Scorecard:

1. Utility and Public Benefits Programs and Policies
2. Transportation Policies
3. Building Energy Codes
4. Combined Heat and Power
5. Appliance and Equipment Efficiency Standards
6. Lead by Example Initiatives (LBE)
7. Research, Development, & Deployment (RD&D)
8. State Tax and Information Incentives

As in the 2007 Scorecard, the utility-sector metrics on customer energy efficiency programs comprised a large share of the total points under this expanded and revised composite scoring scheme. These metrics, categorized as Utility and Public Benefits Programs and Policies, accounted for a total of 20 points out of the maximum of 50 points. An important change in the 2008 Scorecard was the addition of scoring for natural gas energy efficiency programs and for regulatory mechanisms to remove disincentives for energy efficiency and to provide positive incentives for successful energy efficiency programs. In 2008, we identified and used five subsets of the Utility and Public Benefits Programs and Policies category to rank each state. Below are these metrics along with the points available for scoring:

1. Electricity Program Spending in 2006 (5 points)
2. Electricity Program Savings in 2006 (5 points)
3. Natural Gas Program Spending in 2006 (3 points)
4. Energy Savings Targets (4 points)
5. Utility Incentives and Removal of Disincentives (3 points)

Combined, a state could earn up to 20 points from energy efficiency program scoring, or 40% of the total possible 50 points, which suggests this policy area’s contribution to total potential energy savings in a state.

The 2008 Scorecard ranked the states on 2006 utility and public benefit electricity energy efficiency program spending as a percent of utility electricity revenues. This is different than the 2007 Scorecard, which ranked the states on electricity energy efficiency program spending per capita. As in previous Scorecards, the electricity program spending data were obtained from EIA, state programs, and personal contacts. The utility electricity revenue data were also taken from EIA.

For annual savings from electricity efficiency programs, we relied on annual *incremental* savings (new energy savings achieved from measures implemented in the reporting year) from electricity energy efficiency programs, as they were reported to ACEEE in a national survey of state-by-state efficiency programs and from utility data reported to the EIA on utility DSM programs. This is a departure from previous years in which we reported and used annual *cumulative* electricity savings from EIA for scoring and ranking. The savings data are for 2006 and are reported as a percent of utility electricity sales in that year.

The 2008 report was the first Scorecard in which we scored states for their natural gas efficiency program efforts. The metric we used was 2006 program spending data (the latest year for which data were available; as with electricity program data, there is a lag in availability of data on expenditures and other metrics). Another difference for natural gas efficiency programs is that there is no national clearinghouse for natural gas program data (as there is with electricity via EIA) and therefore we relied on state program reports reviews and other data sources (CEE 2006, 2007). A number of states do not report data for natural gas efficiency program spending and we therefore assigned them a zero for this category.

We again applied a metric for the establishment of "Energy Efficiency Resource Standards," which we had introduced in the 2007 Scorecard. In the 2008 Scorecard we added metrics for assessing state's efforts for regulatory and policy initiatives that help to align utility financial objectives with energy efficiency program objectives—changes that are intended to create a new "business model" for energy utilities.

Under traditional regulatory structures, utilities do not have an economic incentive to help their customers become more energy efficient. In fact, they typically have a disincentive because falling energy sales from energy efficiency programs reduce utilities' revenues and profits, an effect that is sometimes referred to as "lost revenues" or "lost sales."

There are two key regulatory mechanisms that address the removal of disincentives and implementation of positive incentives for reducing customer energy use through improved levels of energy efficiency: fixed cost recovery (decoupling and other lost revenue adjustment mechanisms) and performance incentives. Decoupling refers to the disassociation of a utility's revenues from sales, which makes the utility indifferent to maximizing sales and more likely to promote efficiency programs. Performance incentives are financial incentives that reward utilities (and in some cases, non-utility organizations) for reaching or exceeding program goals. In the 2008 Scorecard, a state could earn points for having adopted financial incentive mechanisms for utility electric and/or natural gas efficiency programs and for having implemented (or to be in the process of implementing) decoupling for its electricity and/or natural gas utilities.

In 2006, total spending on electric utility customer energy efficiency programs was \$1.6 billion. Total spending on natural gas energy efficiency programs was approximately \$300 million.

Table 5 presents a summary of the scores for the five Utility and Public Benefits Programs and Policies policy category subsets for the top ten states from the 2008 Scorecard.

**Table 5. Summary of Scoring of Top Ranked States on Utility and Public Benefits Programs and Policies (2008 Scorecard)**

| State         | 2006 Electricity Program Spending (1000s) and (spending as a percent of revenues) | 2006 Electricity Savings (MWh) and (savings as a percent of electricity sales) | 2006 Gas Program Spending (1000s) and (spending relative to state natural gas consumption—\$ per MMcf) | Targets (Energy Efficiency Resource Standards) | Utility Incentives and Removal of Disincentives | Ranking |
|---------------|---|--|--|--|---|---------|
| Vermont       | \$15,806<br>(2.4%)  | 62,872<br>(1.08%)  | \$1,500<br>(\$187)   | 4  | 2   | 1       |
| Connecticut   | \$69,600<br>(1.5%)  | 328,000<br>(1.04%)   | \$1,400<br>(\$ 15)   | 3  | 3   | 2       |
| California    | \$357,000<br>(1.1%)   | 1,912,000<br>(0.73%)   | \$94,100<br>(\$ 64)  | 3  | 3   | 3       |
| Minnesota     | \$48,109<br>(1.0%)  | 370,443<br>(0.55%)   | \$15,200<br>(\$ 49)  | 4  | 2   | 4       |
| Oregon        | \$63,318<br>(2.0%)  | 369,827<br>(0.77%)   | \$12,100<br>(\$ 87)  | 0  | 2   | 4       |
| New York      | \$224,897<br>(1.1%)   | 814,293<br>(0.58%)   | \$21,900<br>(\$ 32)  | 3  | 2   | 6       |
| Massachusetts | \$125,000<br>(1.5%)   | 455,000<br>(0.82%)   | \$25,600<br>(\$128)  | 0  | 2   | 6       |
| Washington    | \$113,288<br>(2.2%)   | 630,691<br>(0.74%)   | \$8,200<br>(\$ 42)   | 1  | 1   | 8       |
| Iowa          | \$52,241<br>(1.7%)  | 314,248<br>(0.73%)   | \$29,500<br>(\$143)  | 0  | 0   | 9       |
| New Jersey    | \$83,177<br>(0.9%)  | 227,764<br>(0.29%)   | \$32,700<br>(\$ 79)  | 2  | 1   | 10      |
| Rhode Island  | \$17,178<br>(1.6%)  | 96,048<br>(1.23%)  | \$0<br>(\$ 0)  | 0  | 1   | 10      |
| Idaho         | \$20,422<br>(1.8%)  | 150,921<br>(0.66%)   | \$900<br>(\$ 15)   | 0  | 1   | 10      |
| Wisconsin     | \$73,285<br>(1.3%)  | 344,232<br>(0.49%)   | \$42,800<br>(\$132)  | 0  | 1   | 10      |

In 2009, ACEEE published *The 2009 State Energy Efficiency Scorecard Report* (Eldridge et. al. 2009), ACEEE's third report in this annual series of reports that rank states on a comprehensive list of energy efficiency policies.

For the 2009 Scorecard we used the same subsets (with a different year of data) that we used in the 2008 Scorecard to rank each state for the Utility and Public Benefits Programs and Policies category, namely:

1. Electricity Program Spending in 2007 (5 points)
2. Electricity Program Savings in 2007 (5 points)
3. Natural Gas Program Spending in 2007 (3 points)
4. Energy Savings Targets (4 points)
5. Utility Incentives and Removal of Disincentives (3 points)

The 2009 report relied on savings and spending data for electric and natural gas utility sector and public benefits energy efficiency programs from 2007. Spending and savings data were reported for programs run in 2007 because these were the most recent data available for all 50 states on actual spending and savings results.

For 2007, total spending on customer electric energy efficiency programs reached \$2.2 billion, up from about \$1.6 billion in 2006. Combined with natural gas program spending of about \$300 million, we estimated national spending of about \$2.5 billion on efficiency programs in 2007.

Table 6 lists the top ten states in the Utility and Public Benefits Programs category in the 2009 Scorecard.

**Table 6. Summary of Scoring of Top Ranked States on Utility and Public Benefits Programs and Policies (2009 Scorecard)**

| State         | 2007 Electricity Program Spending (1000s) and (spending as a percent of revenues) | 2007 Electricity Savings (MWh) and (savings as a percent of electricity sales) | 2006 Gas Program Spending (1000s) and (spending relative to state population - \$ per capita) | Targets (Energy Efficiency Resource Standards) | Utility Incentives and Removal of Disincentives | Ranking |
|---------------|---|--|---|--|---|---------|
| Vermont       | \$23,690<br>(3.4%)  | 105,203<br>(1.8%)  | \$1,500<br>(\$2.4)  | 4  | 3   | 1       |
| California    | \$755,279<br>(2.2%)   | 3,393,016<br>(1.3%)  | \$118,100<br>(\$3.2)  | 3  | 3   | 2       |
| Connecticut   | \$95,716<br>(2.0%)  | 371,899<br>(1.1%)  | \$2,600<br>(\$0.7)  | 3  | 3   | 3       |
| Massachusetts | \$120,157<br>(1.4%)   | 489,622<br>(.86%)  | \$25,600<br>(\$4.0)   | 4  | 2.5   | 3       |
| Minnesota     | \$91,239<br>(1.7%)  | 463,543<br>(.68%)  | \$15,600<br>(\$3.0)   | 4  | 2.5   | 5       |
| New York      | \$241,543<br>(1.6%)   | 540,612<br>(.36%)  | \$10,600<br>(\$0.5)   | 4  | 3   | 6       |
| Washington    | \$126,678<br>(2.6%)   | 635,062<br>(.74%)  | \$8,200<br>(\$1.3)  | 2  | 2   | 6       |
| Oregon        | \$69,107<br>(2.1%)  | 437,494<br>(.90%)  | \$10,700<br>(\$2.9)   | 0  | 2   | 6       |
| Rhode Island  | \$17,936<br>(1.9%)  | 64,995<br>(.81%)   | \$1,900<br>(\$1.8)  | 1  | 2   | 9       |
| Iowa          | \$56,493<br>(1.4%)  | 322,177<br>(.71%)  | \$28,400<br>(\$9.5)   | 3  | 0   | 9       |

### 2010 and Beyond: Rapid Expansion, New Drivers, New Players, and New Challenges

ACEEE's 2010 Scorecard documented the continued rapid growth and acceleration of spending on utility and public benefits energy efficiency programs (Molina et al. 2010). Since the apparent low-point in spending on such programs in 1998, spending increased more than three-fold from \$900 million to about \$2.6 billion in 2008 for electricity programs. And in 2009, total budgets for electricity efficiency programs reached about \$3.4 billion.

For the 2010 Scorecard, ACEEE made a fundamental change in the metric used to track the costs of utility and public benefits programs. In all previous Scorecard reports (both the multi-dimensional State Scorecards and the earlier utilities-only Scorecards), we had relied on reported *actual expenditures*. In the 2010 Scorecard, we scored states on reported annual energy efficiency electricity program *budgets* for 2009. The primary reason for this change was to reduce the lag associated with tracking actual expenditures, which effectively has been 2 years given the time involved with reporting, confirming, compiling, and reporting program data to such organizations as EIA. Later in this report we discuss advantages and disadvantages of using budget data versus actual expenditure data.

For electricity savings we relied again on annual incremental savings (new electricity savings achieved from measures implemented in the reporting year) in 2008 from electricity energy efficiency programs<sup>10</sup> from utility data reported to EIA on utility DSM programs or as they were reported to ACEEE. We used this data set as it is the most complete set available for savings at the individual utility level, which we then readily aggregated in deriving state totals. The 2010 Scorecard also included scoring categories for EERS, utility financial incentives, and removal of disincentives for energy efficiency.

**Table 7. Summary of Scoring of Top Ranked States on Utility and Public Benefits Programs and Policies (2010 Scorecard)**

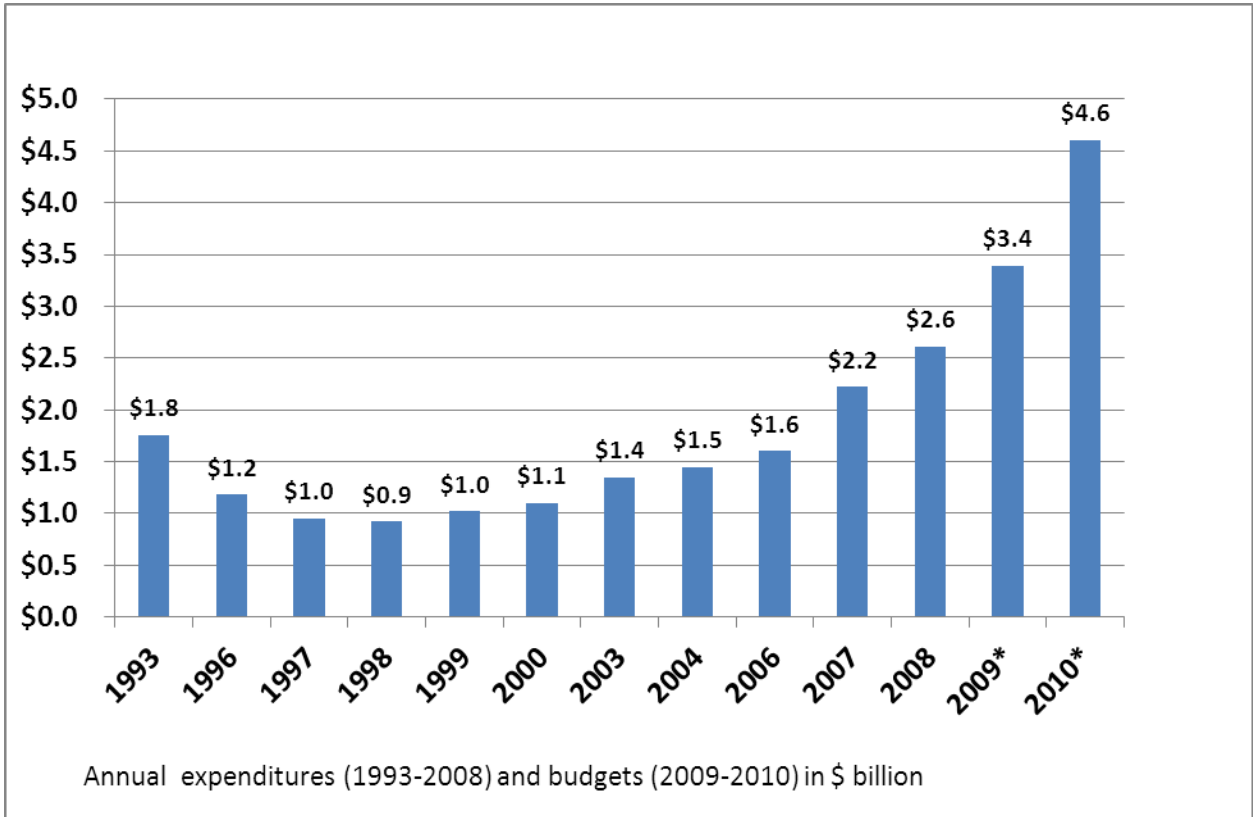
| State         | 2009 Electricity Program Budgets (1000s) and (budget as a percent of revenues) | 2008 Electricity Savings (MWh) and (savings as a percent of electricity sales) | 2009 Gas Program Budgets (1000s) and (budgets relative to residential customers — \$ per customer) | Targets (Energy Efficiency Resource Standards) | Utility Incentives and Removal of Disincentives | Ranking |
|---------------|--|--|--|--|---|---------|
| Vermont       | \$30,700<br>(4.40%)  | 148,549<br>(2.59%)   | \$1,800<br>(\$50.1)  | 4  | 2.5   | 1       |
| California    | \$998,300<br>(2.86%)   | 3,043,965<br>(1.14%)   | \$378,400<br>(\$36.0)  | 3  | 3   | 2       |
| Rhode Island  | \$29,500<br>(2.66%)  | 60,053<br>(0.77%)  | \$7,600<br>(\$34.0)  | 3  | 2.5   | 3       |
| Massachusetts | \$183,800<br>(2.20%)   | 388,254<br>(0.69%)   | \$38,000<br>(\$27.3)   | 4  | 3   | 4       |
| Minnesota     | \$111,200<br>(2.19%)   | 540,805<br>(0.79%)   | \$22,300<br>(\$15.8)   | 4  | 2.5   | 5       |
| Oregon        | \$84,700<br>(2.34%)  | 318,239<br>(0.65%)   | \$20,800<br>(\$30.8)   | 3  | 2   | 6       |
| Wisconsin     | \$101,100<br>(1.64%)   | 545,062<br>(0.78%)   | \$61,300<br>(\$37.2)   | 1  | 3   | 7       |
| Washington    | \$146,500<br>(2.48%)   | 530,029<br>(0.61%)   | \$18,900<br>(\$18.0)   | 2  | 2   | 8       |
| Hawaii        | \$35,500<br>(1.65%)  | 204,596<br>(1.97%)   | \$0<br>(\$00.0)  | 3  | 1   | 9       |
| Iowa          | \$55,600<br>(1.78%)  | 323,285<br>(0.71%)   | \$34,800<br>(\$39.9)   | 3  | 0   | 9       |
| New York      | \$378,300<br>(1.73%)   | 471,108<br>(0.33%)   | \$42,900<br>(\$10.0)   | 4  | 3   | 9       |

The 2011 Scorecard (Sciortino, Neubauer et al. 2011) revealed continued rapid growth and expansion of utility and public benefits energy efficiency programs. Budgets for electric

<sup>10</sup> We did not report natural gas savings data due to the difficulty of obtaining data and the uncertain nature of the data that was available.

energy efficiency programs grew by over \$1 billion from 2009 to 2010, from \$3.4 billion to \$4.6 billion, an annual growth of 35%.

**Figure 1. Total State-Level Energy Efficiency Program Spending or Budgets by Year, 1993–2010**



\* Sources: Nadel et al. 2000; York and Kushler 2002, 2005; Eldridge et al. 2008, 2009; Molina et al. 2010; Sciortino, Neubauer et al. 2011

The top tier of states as scored for utility and public benefits programs and policies is very consistent with earlier Scorecards. Vermont remained the top-ranked state from 2010 and the following states all ranked in this top ten: Massachusetts, Rhode Island, Minnesota, California, Iowa, Oregon, Washington, Hawaii, and Connecticut. Two states rose into this top tier in 2011: New York and Utah. And Wisconsin dropped out of this tier.

We continued the change noted in our 2010 Scorecard of using budgeted energy efficiency program data for scoring rather than actual expenditures as ACEEE had done in its earlier data tracking. This is possible through the data gathered and reported by the Consortium for Energy Efficiency (CEE) in collaboration with the Institute for Electric Efficiency (IEE), as reported in CEE’s Annual Industry Reports (CEE 2006-11). This improves the timeliness of the Scorecard, especially in periods of rapid change as exhibited in recent years with the rapid growth of program activity and associated budgets. As in the past, we supplement the CEE/IEE data with information from individual contacts at state utility commissions. In 2011 we reached out to every state utility commission to confirm and revise data as necessary, which was the case for several states. Such revisions may reflect updated data, which is common for programs due to the timing of reporting. Revisions also may reflect additions of data not reported or available for initial data sets.

**Table 8. Summary of Scoring of Top Ranked States on Utility and Public Benefits Programs and Policies (2011 Scorecard)**

| State         | 2010 Electricity Program Budgets (1000s) and (budget as a percent of revenues) | 2009 Electricity Savings (MWh) and (savings as a percent of electricity sales) | 2010 Gas Program Budgets (1000s) and (budgets relative to residential customers - \$ per customer) | Targets (Energy Efficiency Resource Standards) | Utility Incentives and Removal of Disincentives | Ranking |
|---------------|--|--|--|--|---|---------|
| Vermont       | \$34,000<br>(4.57%)  | 90,235<br>(1.64%)  | \$2,100<br>(\$56.4)  | 4  | 2   | 1       |
| Massachusetts | \$301,900<br>(3.69%)   | 458,658<br>(0.84%)   | \$83,800<br>(\$61.2)   | 4  | 3   | 2       |
| Rhode Island  | \$32,100<br>(2.92%)  | 81,543<br>(1.07%)  | \$4,800<br>(\$21.3)  | 4  | 3   | 2       |
| Minnesota     | \$160,200<br>(2.80%)   | 637,845<br>(1.00%)   | \$40,100<br>(\$28.2)   | 4  | 2.5   | 4       |
| California    | \$1,158,100<br>(3.42%)   | 2,293,007<br>(0.88%)   | \$338,800<br>(\$32.2)  | 3.5  | 3   | 5       |
| New York      | \$583,600<br>(2.47%)   | 949,575<br>(0.68%)   | \$48,000<br>(\$11.1)   | 4  | 3   | 6       |
| Iowa          | \$67,800<br>(1.93%)  | 409,735<br>(0.94%)   | \$40,500<br>(\$46.2)   | 3.5  | 0.5   | 7       |
| Oregon        | \$91,100<br>(2.60%)  | 291,658<br>(0.61%)   | \$22,800<br>(\$33.7)   | 2  | 1.5   | 8       |
| Washington    | \$184,900<br>(3.35%)   | 665,204<br>(0.74%)   | \$9,100<br>(\$8.60)  | 3  | 1.5   | 8       |
| Hawaii        | \$19,300<br>(0.77%)  | 113,159<br>(1.12%)   | \$0<br>(\$00.0)  | 4  | 2   | 10      |
| Utah          | \$55,500<br>(2.86%)  | 176,505<br>(0.64%)   | \$36,100<br>(\$44.5)   | 0  | 1.5   | 10      |
| Connecticut   | \$126,900<br>(2.18%)   | 250,373<br>(0.84%)   | \$11,500<br>(\$23.5)   | 0  | 2   | 10      |

The primary objective of energy efficiency programs is to save energy through some type of energy efficiency improvement that is facilitated by a customer program. Tracking energy budgets measures program inputs. Tracking program savings measures program outputs or impacts. The 2011 Scorecard showed that energy savings have risen in concert with the increases shown in budgets. There is an inherent lag in energy program savings data available, however, due to the time requirements of evaluating program impacts. We discuss measurement of energy efficiency as a resource in greater detail in a following section.

Energy efficiency programs are yielding significant energy savings. In 2009, the national total annual savings were 13,147 TWh or 0.37% of total energy sales. Five states saved 1.0% or greater. The top state by this metric was Vermont at 1.64% savings. These are incremental annual savings, that is, the annual savings achieved by measures taken by

customers as a result of programs in the reporting year, 2009. As discussed below in the next section, these savings values should continue to increase as states strive to achieve energy efficiency resource standards, which in many cases will reach 2% savings targets (of total annual sales) as these ramp up to maximum levels.

The 2011 Scorecard documented a total of 24 states as having energy EERS. Since its publication, this total has risen to 25, meaning that now half the states have EERS in place. These policies clearly are helping drive the observed rapid growth of utility and public benefits energy efficiency programs. States with EERS are well on track for meeting their savings targets according to recent research by ACEEE (Sciortino, Nowak et al. 2011). Meeting these goals and sustaining the savings will require programs to continue to reach and serve large numbers of customers. ACEEE also recently examined how programs are responding to the challenges posed by meeting EERS goals (Nowak et al. 2011). This research revealed numerous strategies being taken to achieve “wider” (greater numbers of participants) and “deeper” (more savings per participant) savings. Additionally, Nowak et al. identified states both with (e.g., California) and without (e.g., Connecticut) an EERS that require utilities to first meet their resource needs through all available energy efficiency and demand reduction resources that are cost-effective, reliable, and feasible. Even absent an EERS, this appears to be a successful approach to achieve significant energy savings.

In 2012, the Institute for Electric Efficiency (Cooper and Wood 2012) and CEE (2012) published 2011 budget data on electric utility energy efficiency programs. As noted earlier, ACEEE uses data from IEE, AGA, and CEE in preparing its annual State Energy Scorecards. We will be examining these data in detail as we prepare the 2012 State Scorecard, which will include our estimates for 2011 energy efficiency programs. Because of some key differences in the data sets, we cannot compare ACEEE’s 2010 program data directly to IEE’s or CEE’s 2011 program data. In a following section, we discuss these differences. However, we can draw out key findings from the IEE and CEE data that further document the trends we’ve observed.

In its 2012 annual industry report, CEE indicates a 2011 electric energy efficiency budget (excluding load management) of \$5.5 billion (CEE 2012). This is more than double the energy efficiency budget than CEE (2008) reported in 2008. IEE reports that total energy efficiency program budgets increased 25% from 2010 to 2011.<sup>11</sup> Program budgets for 2011 in six states were more than double their 2010 budgets; these states are Indiana, North Dakota, South Dakota, Virginia, Washington, D.C., and West Virginia. This finding supports ACEEE’s observation that a number of states are rapidly ramping up program activity and associated spending from relatively little activity historically.

## **MEASUREMENT OF ENERGY EFFICIENCY AS A RESOURCE**

A fundamental tenet of demand-side management and related customer energy efficiency programs is that the energy savings achieved comprise a real energy resource that can be harnessed in a way analogous to producing and delivering an equivalent amount of energy supplied to customers as electricity or fuels. The advent of customer energy efficiency programs necessitated the development of methods to quantify energy savings, as well as to analyze the costs and benefits of these programs. Typically energy savings are estimated and aggregated according to the following levels:

---

<sup>11</sup> In some cases, when IEE didn’t receive a response from a state in 2010 and then did in 2011, they counted the change from zero to a non-zero value as “doubling.”

- Individual measures (e.g., what amount of energy savings did CFL lighting rebates contribute to a residential rebate program?)
- Projects (e.g., what were the energy savings associated with a specific manufacturing plant's installation of energy-efficient motors, lighting, and air compressors?)
- Individual customers (e.g., on average, how much energy did individual customers save as a result of participating in a second refrigerator turn-in program?)
- Programs (e.g., how much energy did a multi-measure residential rebate program save in 2011?)
- Portfolios (of entire utilities or other program administrators) (e.g., how much energy did one utility save as a result of all of its energy efficiency programs in 2011?)
- States or regions (e.g., how much energy did California save as a result of the utility sector energy efficiency programs in 2011?)

While data reporting on energy efficiency is straightforward in principle, in practice there are many difficulties faced in arriving at accurate, consistent, complete, and reliable estimates of energy savings achieved through customer programs. The field of energy program evaluation arose in tandem with utility DSM and other customer end-use programs in response to this challenge. Evaluation plays a key role in energy efficiency programs—providing critical information on program design, implementation, and impacts.

The focus of this report is the data reported by utilities and related organizations that allow tracking and comparison at the state level and, in turn, the national aggregate of all states. In ACEEE's efforts to track and report state-level data, we have focused on a few key program metrics, all revolving around money and energy savings. Tracking the "money" (program expenditures or budgets) provides a strong measure of the relative value that energy efficiency has for a utility or statewide program. Over three decades of experience with customer energy efficiency programs has provided abundant evidence that such programs do make a difference in getting customers to take actions to save energy (Kushler and Witte 2001). Therefore, the amount of money spent on and invested through customer energy efficiency programs affects the amount of energy savings achieved through such efforts. While money is a good proxy for a given state or utility's commitment to energy efficiency and its overall level of program activity, ultimately what really matters is the amount of energy savings achieved. Energy efficiency programs are carried out to save customers energy, and in doing so, also help reduce overall utility system costs and yield other economic benefits, such as job creation. They also clearly can yield significant environmental benefits, although typically programs are cost-justified without explicit inclusion and quantification of environmental benefits.

In this section we discuss key data sources and how ACEEE has used these sources over its years of tracking energy efficiency programs. We also discuss problems with program data, primarily accuracy, completeness, and consistency. Despite these problems, ACEEE believes the data it has gathered and reported over the years represents an accurate picture of state and national energy efficiency programs as provided to energy utility customers through the utilities themselves or non-utility organizations.

### **Data Sources**

A primary source of data on electric utility energy efficiency programs is the Energy Information Administration Form 861. This form is required to be completed every year by all

types and sizes of electric utilities—all electricity providers serving end-use customers—from small municipal utilities to large, multi-state investor-owned utilities. EIA compiles data submitted by companies and publishes various annual data summaries. The EIA data forms and reporting were initiated in the 1980s, the era when utility DSM became widely implemented. These new data series complemented long-time data collection and reporting by EIA on a wide range of supply-side metrics, such as electricity sales and revenues. ACEEE has relied on the EIA 861 data sets as core data for our utility data tracking because of its uniquely comprehensive nature. Until fairly recently it was the only available national level database of electric utility programs spending and savings results.

The EIA 861 data are a highly valuable resource. No other data collection effort is as comprehensive or as long-standing. As valuable as this resource is, ACEEE has encountered a variety of problems with the data sets, which we have addressed principally over the years by supplemental research to fill in missing data and revise data based on other sources. A fundamental problem with the EIA 861 data is that it is restricted to electric utilities and therefore does not capture data from non-utility organizations providing customer energy efficiency programs.<sup>12</sup> With the advent of electric utility restructuring in the 1990s, fundamental changes also occurred in the availability and administration of customer energy efficiency programs. In many cases, new non-utility organizations assumed the role of administering and providing customer energy efficiency programs. In some of these cases there were entirely new organizations created while in others existing organizations took on these roles. Examples of non-utility programs run by non-utility administrators are statewide programs in Oregon, Efficiency Vermont, Focus on Energy (Wisconsin), New York Energy \$mart, and the New Jersey Clean Energy Program. These non-utility programs are not included in the EIA 861 data sets, thereby creating key gaps in state-by-state coverage of customer energy efficiency programs. Another fundamental problem with the EIA data is that they do not include natural gas programs. A third fundamental problem with the EIA data is that the cycle of reporting and time necessary to compile the data yields a lag of at least one year.<sup>13</sup>

ACEEE historically has used utility DSM data as reported in the *Annual Electric Power Industry Report*, as published by the EIA (2000-2011) on their website based on data collected from Form 861 as the primary survey instrument. In ACEEE's initial *Utilities Scorecard*, this data set was the only source used. In subsequent *Scorecard Updates*, ACEEE supplemented the EIA data with a variety of sources, including personal contacts with program and regulatory staff, annual reports from DSM and public benefits programs, regulatory filings by utilities, and selected state level reports and analyses.

CEE initiated an effort in 2006 to gather energy efficiency program data from both utilities and non-utility organizations, for both electricity and natural gas programs in the United States and Canada (CEE 2006). CEE's efforts rose in part to address some of the problems noted above with the EIA's data collection efforts. CEE published its first *Energy-Efficiency Industry Report* in 2006 and has since published this report with updated data every year (CEE 2006-2011). Like ACEEE's *Scorecards*, CEE's *Energy-Efficiency Industry Reports*

---

<sup>12</sup> Cooper and Wood (2012), for example, reported that non-utility expenditures represented approximately 11% of total energy efficiency expenditures in 2008-2010.

<sup>13</sup> While generally the EIA schedule has been to report data for a reporting year by late the following year (for example, 2005 program year data would be reported late in 2006), ACEEE has found this schedule to vary—sometimes reporting year data has not been available until early in the 2<sup>nd</sup> year afterward. Combined with the need to gather additional data to fill in gaps, the result has been that ACEEE's *Scorecards* and related reports generally would be 2 years lagging the present year.

provide important state-by-state summary data on utility and public benefits programs. These reports also aggregate the data to be able to give national data on program costs and energy savings. In recent years, CEE has partnered with IEE and the American Gas Association (AGA) in its data-gathering efforts. Such collaboration has helped expand the set of targeted organizations. IEE and AGA each now publishes an annual report on customer energy efficiency programs for electric and natural gas utilities, respectively (Copper and Wood 2012; AGA 2011)

ACEEE and CEE (in association with IEE and AGA) presently are the only organizations tracking and reporting utility-sector energy efficiency program data on a state-by-state and national level. The Energy Information Administration has published periodic summaries of its utility Form 861 DSM data, but these data do not include non-utility administered programs—the "public benefits" programs that have been established in many states, often resulting from electric industry restructuring in each state. EIA is changing and plans to introduce data reported by non-utility energy efficiency program administrators in future annual reports.

### **Data Difficulties and Limitations**

The quality and quantity of data on customer energy efficiency programs administered by utilities and non-utility organizations has improved markedly over the 30+ years that such programs have been provided in many states and service territories. Despite these improvements, there remain a variety of difficulties and limitations with available data.

One set of problems is due to differences in reporting conventions, definitions, and requirements from state to state and the organizations within states responsible for administering, implementing, and evaluating programs. There are no national standards or commonly-followed guidelines for the tracking and federal reporting of energy efficiency program data. Some of these differences stem from different needs of, and constraints faced by, administering organizations, which vary widely in their size and capabilities—from small coops and municipal utilities to large, multi-state investor-owned utilities and federal power authorities. Other variations in reporting result from fundamental differences in how programs define and report program impacts. Some examples of these problems include:

- Defining and estimating "net" impacts from programs. There is no universally accepted method for estimating net impacts; some methods yield large adjustments to gross program savings; others yield little or no adjustment.
- Reconciling available data as defined and gathered with requested data fields from EIA and other reporting bodies. When an energy efficiency program administrator uses different reporting conventions than EIA, it is not clear how administrators revise or adjust their data to meet these conventions. Selected examples:
  - Basis for reported program savings: planning estimates, project tracking, or ex post verified impacts?
  - Reporting year versus a non-calendar year, such as a fiscal or program year.
  - "Cumulative" savings presents some particularly difficult issues given this metric's complexity, which include:
    - Starting year for the cumulative series?
    - Accurate accounting for measure lives?
    - Decay of savings due to premature failure of measures or their withdrawal for other reasons?

- The inherent data lag associated with energy program evaluation; accurate ex-post impact results generally cannot be determined for about a year or more after the end of a selected program year to be evaluated. Tracked deemed savings may differ after verification; verification is often done by statistical sampling.

The other main set of data problems involves difficulties with getting complete, accurate, consistent, and reliable data from all organizations that administer energy efficiency programs for natural gas and electric end-use customers. Below are key problems we have encountered in our work that fall into this category:

- Missing data/incomplete reporting. We have encountered cases where a utility is entirely absent from the data set. In other cases there may be significant gaps in the data—i.e., data missing from certain data fields.
- Inconsistency between/among sources. There may be significant differences in data from a national source such as EIA compared to data reported by a state organization. One reason for this difference, for example, could be the time in the program cycle when the data is obtained from an entity. It is not uncommon that reported savings vary based on whether they are initial projections, project tracking values, or verified savings (all come at different points in a program cycle).
- Self-reporting errors. There are likely different interpretations of requested metrics with very little quality checking or follow-up by organizations gathering data. The EIA data are not independently verified; CEE/IEE/AGA does some follow-up as key problems are identified, but this is limited by available resources and time.
- Allocation issues. For utilities and other program administrators serving multiple states, the data are not necessarily accurately and consistently reported at the state level.

ACEEE's experience is that tracking dollars is generally more accurate and reliable than tracking energy savings from programs. That is, the data available on program costs are generally much more complete and accurate compared to program energy savings. However, even tracking program costs is not always straightforward. One fundamental issue is whether to use "budgeted costs" or "actual expenditures." EIA 861 data forms request actual expenditures. CEE's initial annual industry reports have relied primarily on reported program budgets; in recent years CEE has reported both actual expenditures and budgets with a one-year lag between these data sets. ACEEE has generally preferred to report actual program costs instead of budgeted amounts. The disadvantage of using expenditures, however, is that there is generally a year or even two-year lag from a current year for reporting these data using EIA. Up until the 2010 Scorecard we used data for actual expenditures. In 2010 we switched to rely on budgeted data to be more timely and better reflect the rapidly changing picture of energy efficiency program activity. While generally budgeted and actual program costs do not vary significantly, in some cases, there are large differences for a variety of reasons. For 2009, our first year for which we tracked both spending and budgets, we found that actual spending was about 90% of the reported budget figures. Nationwide, electric efficiency program budgets totaled around \$3.4 billion in 2009, compared to actual spending of \$3.1 billion. Our analysis showed that there were states with significant gaps between budgets and actual spending. Such gaps could be explained by lags in program initiation, unforeseen outcomes in program implementation and customer participation (e.g., program uptake was slowed by the "Great Recession"), or the ability to deliver program more cost-effectively than anticipated.

## Data Sources

State and regional reporting of data on utility and public benefits programs varies widely. Some states routinely gather and report a complete statewide annual summary on key metrics, such as program expenditures and savings impacts. Such statewide reports may be prepared by a state's public service commission, state energy office, or a statewide non-utility program administrator. In other states there may be no single compilation of individual programs within the state. In these cases each responsible program administrator (typically individual utilities) may be required to file annual reports on their energy efficiency programs. There may also be differences associated with reports and data availability by type of energy service—electric or natural gas. There are states without any routine annual reporting of customer energy efficiency program data; without such efforts they miss out on recognition of their progress. There also are a few cases where the lack of a consistent, publicly available data set has resulted in likely under-reporting of program activity.

This wide variation in state-level data reporting and availability makes it very difficult to build a national database on utility and customer energy efficiency programs as a possible alternative or supplement to the EIA and CEE efforts. Over the years ACEEE has routinely drawn upon selected state-level sources to supplement and complement the EIA data especially. The state-level sources provide an important reference by which to check the accuracy and consistency of the EIA data.

Various regional energy efficiency organizations are now playing important roles for gathering and reporting data on energy efficiency programs within their regions, typically at the state level. These groups have several advantages for gathering these data: (1) well-established, close working relationships with key stakeholders in their region, including utilities, non-utility program administrators, regulators, and state energy agencies; (2) they have to track a much smaller set of entities compared to a national effort; and (3) in some cases, the regional organization itself plays a key role as program facilitator, coordinator, or technical advisor—thereby having ready access to a range of program data. Both the Southwest Energy Efficiency Project (SWEET) and the Midwest Energy Efficiency Alliance (MEEA) compile and report annual state-level data within their regions, drawing upon diverse data sources. The Northeast Energy Efficiency Project (NEEP) has been spearheading a regional effort referred to as the EM&V Forum since 2008 to achieve consistency and comparability of energy program evaluation data.<sup>14</sup> The EM&V Forum could well serve as a model for taking this effort to a national level. The Pacific Northwest (Oregon, Washington, Idaho, and western Montana) has a long history of regional collaboration and coordination. The Northwest Power and Conservation Council (NPCC) compiles and reports detailed energy efficiency program data for the region, utility by utility. While this provides a comprehensive, complete, and accurate picture of the region as a whole, the data are not tracked and reported at the individual state level. It is possible to derive these estimates to a degree independently, which ACEEE has done in association with our Scorecard and related data tracking. ACEEE sees a great potential for these regional efforts in helping build a strong national database on utility and public benefits energy efficiency programs. MEEA recently initiated a regional EM&V initiative in the

---

<sup>14</sup> See <http://www.neep.org/emv-forum>. From this webpage, "The Regional Evaluation, Measurement and Verification Forum (EM&V Forum) supports the development and use of common and/or consistent protocols to evaluate, measure, verify, and report the savings, costs, and emission impacts of energy efficiency. Launched in 2008, it is the only program of its kind in the country spanning eleven states."

Midwest to work towards greater consistency in program data measurement, evaluation, and reporting.

At the national level, EIA has been and continues to be a primary source for customer energy efficiency program data as discussed earlier. CEE has also become a primary source for customer energy efficiency program spending data. As discussed earlier, ACEEE draws upon these data sources for our annual Scorecard reports. While ACEEE and CEE (along with its collaborators IEE and AGA) each now prepare and publish annual reports on energy efficiency programs at both the national and individual state levels, there are key differences that account for differences in reported results. It is also important to note that while ACEEE does incorporate CEE data, the analyses and conclusions of ACEEE's such as in the annual Scorecards are ACEEE's alone. The principal difference in certain reported results is that CEE's definition of "the energy efficiency industry," as used in its annual reports, is broad. It encompasses four primary data sets: electric energy efficiency programs (non-low-income residential, commercial, industrial, and other), low-income residential electric programs, natural gas programs, and electric load management (including demand-response) programs. These four primary data sets are combined to give a national total for the energy efficiency industry. ACEEE's *State Scorecards* and earlier *Utility Scorecards* only use data for energy efficiency programs, not load management.

Minor differences between ACEEE and CEE data arise due to differences in reporting entities. CEE relies on data gathered in annual surveys of program administrators (both utilities and non-utility organizations) with efficiency budgets of \$1 million or more. ACEEE contacts each state utility regulatory agency to confirm the state data totals ACEEE compiles from CEE and other program data sources. In some cases the state regulatory contacts may have data on programs in their states not included in CEE's data. Another source of some variation in data sets is simply the timing of the data reporting. As noted earlier, program data generally will vary somewhat depending on the program stage captured at the time data are reported. As programs are implemented and evaluated, it is common for initial program estimates and tracking reports to be revised. Another minor difference is due to reporting of budgets versus expenditures. Until recently CEE reported program budgets, not expenditures. We discussed this difference earlier in this report. CEE now includes both budgets and expenditures (with a year lag between them) and ACEEE uses budget data for our annual Scorecard.

The completeness, accuracy, and consistency of energy efficiency program data at the state, regional, and national levels have experienced significant improvement over the past decade, driven by the efforts of organizations such as CEE, IEE, AGA, ACEEE, and EIA/DOE. There remain improvements to be made with data tracking and reporting from the individual program levels up to national efforts. All of these organizations and many others continue to work toward such objectives. However, the regulatory demands that have existed from the inception of utility energy efficiency programs to assure cost-effectiveness of these utility customer energy efficiency programs have driven the development and maturation of the professional practice of energy efficiency program evaluation (Kushler et al. 2012). This increases confidence in the measurement of energy efficiency as a resource and associated reporting on program costs and benefits.

## **EMERGING ISSUES, TRENDS, AND OUTLOOK FOR UTILITY-SECTOR ENERGY EFFICIENCY PROGRAMS**

In the previous sections, we have discussed and documented over 20 years of experience with customer energy efficiency programs as administered by utilities and non-utility organizations. Since the late 1990s, there has been a generally strong and steady growth of these programs. In this section, we examine emerging issues, trends, and the outlook for utility-sector programs, particularly for electricity energy efficiency programs.

The role of utility-sector energy efficiency has undergone a dramatic transformation. In just the last few years, energy efficiency has evolved from being largely a token gesture or a “public benefits” set-aside to being a top-priority utility system resource. Indeed, several states have established state policies that mandate energy efficiency as “first” in the “loading order” of electric utility resources, and/or that their states should capture “all cost-effective energy efficiency.”

The causes of this profound increase in prominence are familiar to those associated with electric utility industry. They include: (1) dramatic increases and great volatility in the prices of all fuels; (2) large and unprecedented increases in the costs of constructing new power plants; (3) shrinking reserve margins leading to concerns about electric system reliability in many regions; (4) growing concerns about the ability to finance and secure cost-recovery for large electric generation construction projects; (5) more stringent environmental regulations affecting fossil fuel generation plants; and (6) mounting concerns about global warming and the realization that some type of policies to reduce greenhouse gas emissions are likely. Together these factors have helped elevate energy efficiency to the status of an essential core utility system resource.

### **Raising the Bar with Energy Efficiency Resource Standards**

A major trend in utility-sector energy efficiency programs is the dramatic growth and expansion of state efficiency programs. States with long-standing, well-funded programs are pushing toward much higher levels of program activity to achieve higher savings. Many states that have not had significant programs in place have initiated major new program efforts. Forces converging today are accelerating in the direction of dramatically scaling-up energy saving and the transformation of markets for a wide variety of products and services that drive and determine energy use. Parallel with these converging forces are market and technology developments that may have dramatic impacts on utility energy markets, mostly the advent and growth of the “smart grid” and related “smart” technologies, new pricing structures, and new market products.

Several states have established aggressive goals for energy efficiency as a means to achieve economic and environmental objectives. No state is scaling back. The momentum is toward growth across the map. Leading states with historically strong track records for energy efficiency are pushing for more energy savings; many previously lagging states have taken major steps including passing “energy efficiency resource standards”—specific energy savings targets in terms of total program savings. The number of states yet to engage in meaningful efficiency efforts is dwindling rapidly. By ACEEE’s count there are now 34 states with “significant” utility sector energy efficiency activities and 17 states without such programs. We define “significant” to mean either having an EERS in place or programs in

place achieving 0.2% annual energy savings per year (as a percentage of total retail energy sales).

Expansion is happening along multiple dimensions. Statutory and regulatory goals are higher for energy savings, codes and standards, and demand reduction. To meet these greater aspirations, utilities and government are increasing budgets and spending. Driven by many of the same pressures as those pointing toward electric efficiency, natural gas efficiency programs are expanding, as well as fuel oil efficiency and conservation programs, coordinated “dual fuel” programs, and propane. Another growth vector is in public power. Whereas in the past a minority of states and a handful of large investor-owned utilities claimed a disproportionate share of program dollars and energy savings, the distribution is now getting flatter and wider as smaller distribution companies, municipal utilities, and co-ops are getting into the game. In some cases such participation by publicly owned utilities is voluntary; in others it is being driven by legislation requiring cooperative and municipal utilities to fund and offer energy efficiency programs to their customers.

While such large increases in program spending might at first blush seem at odds in our present era of reduced spending at all levels of government and other “public” spending,<sup>15</sup> there is substantial documentation on the very real value of such spending on energy efficiency through utility customer energy efficiency programs. ACEEE reviewed a large set of energy efficiency programs and found that the average “cost of saved energy”—the cost to the utility to save a kilowatt-hour of electricity through such programs—is about 2.5 cents/kWh (Friedrich et al. 2009). This is one-third to one-quarter the cost of any type of new generation resource (by conventional fossil fuels or renewable energy). Thus investments in energy efficiency through programs provided to utility customers yield significant positive returns—lowering overall energy costs for customers and utilities.

In response to higher savings targets and associated larger program budgets, utilities and non-utility public benefits programs are being forced to go “broader and deeper.” Going “broader” means that programs are working to increase customer participation, either in existing programs or by offering new programs serving customers and markets previously under-served or not served at all. Going “deeper” means getting more savings for each participating customer by implementing a more comprehensive set of measures than programs achieved earlier. To do so will mean that programs will need to seek more comprehensive retrofits of existing buildings. Programs also will need to seek to “transform” markets associated with customer end-uses of energy such that highly energy-efficient products and services become dominant in such markets.

The frontier of utility-sector energy efficiency programs has advanced a long way from the first days of utility demand-side management. Some states are looking to push savings goals and actual impacts to the point of “bending the demand curve downward”—that is, saving more through energy efficiency programs than the growth in demand.

Other issues on the frontier of utility-sector energy efficiency include:

---

<sup>15</sup> Technically the types of programs addressed in this report—those funded by utility ratepayers through their utility rates or related “public benefits charges” on utility bills—are not “government” programs or spending. Such programs are funded through various state and federal taxes. There may be a perception, however, that utility ratepayer and public benefits programs are associated with “government” programs or mandates.

- Using energy efficiency as a competitive energy resource within wholesale power markets; in New England, energy efficiency can now compete in the regional forward capacity market. The Federal Energy Regulatory Commission (FERC) is similarly looking at how energy efficiency and related demand-side resources can be incorporated into wholesale markets.
- Using energy efficiency to achieve greenhouse gas reduction in regional cap-and-trade systems; the Regional Greenhouse Gas Initiative (RGGI) includes explicit provisions for credits from energy efficiency and trading mechanisms that generate funding for energy efficiency savings. Chang et al. (2010) noted that RGGI revenues of \$295 million were invested in energy efficiency programs in 2009. Their analysis indicated that those RGGI-funded energy efficiency programs will provide over \$443 million dollars in lifetime-avoided cost electricity benefits.
- Using energy efficiency as a transmission and distribution resource (Neme and Sedano 2012).

These emerging issues and new applications of energy efficiency as a resource create new opportunities, such as new sources of revenue, but also create challenges for measurement, verification, and attribution of savings to specific programs and initiatives promoting energy efficiency.

### **Trends to Watch**

The clear trend for utility and public benefits energy efficiency programs has been rapid growth over the past decade. We see this trend continuing over the next decade given the numerous state EERS policies in place and the continued growth of utility and public benefits programs in states that have not had significant programs in place. The same fundamental drivers for greater use of energy efficiency as a utility resource remain in place. These include very high power plant construction costs; high and volatile fuel costs; energy efficiency as an economic development strategy; and growing environmental costs associated with fossil fuel combustion. One analysis of state-level energy efficiency policies estimates that funding for customer electric and natural gas energy efficiency programs could rise from \$3.1 billion in 2008 to \$12.4 billion by 2020 (Barbose, Goldman, and Schlegel 2009). In addition to increased spending, this study also suggests a significant broadening of the national energy efficiency market, with a large portion of the projected increased spending coming from states that have been relatively minor players in the industry.

While we see ample signs indicating continued growth of utility and public benefits energy programs, there are some reasons to place a caveat on projections of continued growth. The 2010 elections included substantial anti-government regulation overtones that are in some ways reminiscent of the deregulation/restructuring movement of the mid-1990s. In addition, the severe budget challenges faced by many states create the potential for “raids” on public benefit energy efficiency budgets. For example, funding for such programs have come under recent attacks in New Jersey, where Governor Christie diverted \$42.5 million from the state’s Clean Energy Fund in FY11 to pay state energy bills, and Wisconsin, where in 2011 the state legislature repealed an earlier approved funding increase to the statewide Focus on Energy program. Beyond specific policy actions affecting programs, the economic downturn of the past few years also has had an impact on energy efficiency programs. Utilities in many states have faced lower overall revenues as a result of lower overall economic activity, which can put cost-cutting pressure on programs. Difficult economic times

also affect customer participation in programs as any new investments may be delayed or canceled.

### **New Business Models and Technologies as Change Agents for Energy Utilities**

From the advent of utility demand-side management it was clear that utility efforts to reduce customer energy use through improved energy efficiency were at odds with utility financial objectives as structured under traditional regulation. ACEEE and other organizations, such as the Regulatory Assistance Project, long have documented and discussed these inherent financial barriers (for recent analyses, see York and Kushler (2011) and RAP (2011b). To align utility financial interests with the energy savings objectives of energy efficiency programs requires addressing three fundamental problems, which are:

- Recovery of energy efficiency program costs. Utilities must be able to recover the prudent costs associated with administering, implementing, and evaluating customer energy efficiency programs. This can occur either by “expensing” or “amortizing” such costs; specific regulatory treatment varies by jurisdiction. Expensing is the most prevalent treatment currently.
- Eliminating the “throughput incentive.” Under traditional ratemaking reducing energy sales through energy efficiency reduces utility revenues, resulting in reduced profits. This problem can be addressed by two principal regulatory mechanisms: (1) “decoupling” of revenues from energy sales; and (2) “lost revenue adjustment mechanisms (LRAM).” Of these two mechanisms, decoupling is the more effective method of eliminating the throughput incentive. The Regulatory Assistance Project recently published a comprehensive examination of utility revenue decoupling (RAP 2011a). ACEEE recently completed a survey of LRAM, which shows a recent surge of interest in and practice of this approach and indicates some of the mechanism’s shortcomings (Hayes et al. 2011a).
- Providing a positive financial incentive for energy efficiency investments. Traditional utility ratemaking allows utilities to earn a return on their capital investments—primarily generation, transmission, and distribution system assets. Unless regulators institute comparable mechanisms for utility investments for energy efficiency, utilities lack this type of positive financial incentive. A growing number of states have taken actions to create “shareholder incentives” (Hayes et al. 2011b).

While the above problems exist regardless of the level of activity and spending on utility energy efficiency programs, such problems grow in size and importance as the level of utility spending on energy efficiency programs increases and along with the resulting energy savings from such efforts. Thus as programs seek much higher savings levels than ever before, these fundamental financial problems become more and more pronounced in their potential impact on utility earnings and profits. Unless addressed through regulatory changes, utilities face strong financial disincentives for saving energy through customer energy efficiency programs. To achieve and sustain the savings targets established in a majority of states, it is more important than ever for these states to enact policies and regulations that will align a utility’s financial interests with successfully reducing customer energy use through improved energy efficiency. Addressing the business model for utility energy efficiency emerged as a key factor associated with states achieving high energy savings (Kushler et al. 2009).

Alternatively, some states have addressed this issue by removing the energy efficiency functions from the utilities almost entirely. In Vermont and Maine, for example, third-party administrators oversee most of the energy efficiency program operations in each state.

### **Smart Grid and Behavior Change: New Tools and Approaches for Energy Efficiency**

With the push towards more aggressive energy savings, there is great interest in new program approaches as well as drawing upon the rapidly emerging world of “smart grid” and related advanced metering, communication, and control technologies to help meet these targets. Behavioral approaches to energy efficiency and conservation are not new; pioneering work in this area was done in the very earliest days of customer energy efficiency programs. “Smart grid” and related advanced metering, communication, and control technologies by contrast are relatively new areas of development, largely drawing upon advances in information technology.

“Behavioral change” is a broad umbrella of program approaches. The common element is focusing on how customers can control their energy use through changes in habits and everyday choices. In a 2010 study, ACEEE reviewed a large set of behavior-based energy efficiency programs to assess trends, impacts, and potential (Ehrhardt-Martinez et al. 2010). This research documented the history and development of behavioral approaches. It also reviewed and highlighted many recent advances and the latest generation of such programs, which especially rely on improved customer feedback, pricing mechanisms, and communications designed to motivate customers to action. In a related review, ACEEE (Friedrich et al. 2010) provided case studies of effective behavioral programs across the spectrum of customer types (residential, commercial, industrial) and applications (buildings, manufacturing plants, transportation technologies). These works illustrate a significant potential for energy savings through behavioral change—a potential being addressed through behavioral approaches to energy efficiency programs.

The potential for “smart grid” technologies is similarly significant, particularly for certain types of customers and applications. The biggest focus for smart grid technologies is load control—reducing peak demand and otherwise affecting the timing of energy use. However, there are numerous advanced metering, communication, and control technologies becoming available that also can help customers save energy through improved energy efficiency. Improved feedback on energy use through advanced metering can help customers better understand where and how they use energy, which can guide them in their choices and use of technologies. Further research will be necessary to better understand and document the potential for these technologies to advance energy efficiency.

### **Challenges and Barriers**

As utilities and other administrators of customer energy efficiency programs expand and accelerate their efforts in order to reach higher targets for energy savings, they face a number of challenges and barriers. These include:

#### *Workforce*

Customer energy efficiency programs require qualified personnel for program development, administration, implementation, and evaluation. The types of professionals required are diverse; the jobs include engineering, management, customer service, skilled trades, statistics, accounting, education, and marketing. Some of the workforce may be internal to

the utility or other organization responsible for administering programs; some of the workforce may be contractors. Typically programs employ both types of workers. While some of the necessary skill sets are not exclusive to energy efficiency programs, most of the jobs associated with developing and providing programs require specific training and experience with the technologies. For example, residential builders and contractors need to be well-versed in all aspects of high performance, energy-efficient construction practices and home energy systems. Evaluation of programs is another area requiring specific training and experience.

With the rapid growth of programs comes a rapid growth in the demand for qualified workers to deliver these programs. While unemployment levels in the overall U.S. economy remain high, energy efficiency programs have encountered difficulties in recruiting and hiring sufficient numbers of qualified personnel as needed, whether for internal staffing or external contracting (Goldman et al. 2010).

### *Measurement of Impacts*

EERS are a relatively recent policy development—in most cases they have been in place less than 5 years with the first applicable year for the requirements being even more recent. Recent research by ACEEE shows that states largely are on track for meeting these targets (Sciortino, Nowak et al. 2011). Measurement of progress in meeting the standards relies on program evaluation results, but there are other practical and policy issues that have to be addressed in each state. There have to be clear guidelines as to what can be counted towards meeting the goals. Some fundamental questions include:

- What types of saving count: net or gross program impacts? If net, how determined?
- Do impacts have to be verified ex post evaluation results? If so, how are administrators to deal with the inherent lag in measuring such results?
- How much control do program administrators have over their evaluation reporting structures? How much involvement do program administrators have in post evaluation efforts typically conducted by third-party evaluators hired by state policymakers or regulators?
- How are savings through other policies or programs treated, such as appliance standards, building energy codes, or combined heat and power systems (customer sited)?

These and other measurement questions have answers, but such answers need to be carefully defined as programs move forward. They comprise the rules that guide the measurement of program impacts in meeting established EERS. ACEEE recently completed an in-depth national survey of individual state evaluation practices (Kushler et al. 2012), which directly addresses measurement of program impacts. This work provides a detailed, comprehensive picture of energy efficiency program evaluation. One objective of this research was to address the question of the development of some type of national evaluation standard of some type. The researchers concluded that this would be very difficult to accomplish given the great diversity they found in evaluation practices from state to state. At the same time, Kushler et al. note the well-developed professional practice in place of program evaluation, which draws upon analytical techniques from a variety of disciplines and has developed and matured over the same 30+ year history of utility and public benefits energy efficiency programs. They conclude that evaluation practices are well-

established and yield robust, accurate estimates of program savings and related impacts. In short, energy savings are indeed real and can be measured and documented.

#### *Reduced Energy Efficiency Opportunities for Energy Efficiency Programs?*

The recent rapid growth in customer energy efficiency programs provided by utilities and related non-utility organizations has occurred in parallel advances in other policies and programs targeting energy efficiency improvements. These include appliance efficiency standards, building codes, federal economic stimulus programs, and state-level initiatives and programs. Such parallel efforts can have the effect of reducing the available energy efficiency savings potential to be achieved specifically through utility and public benefits programs. For example, residential lighting programs have relied on compact fluorescent light bulbs (CFLs) for achieving large savings. However, new federal standards are being enacted that effectively reduce the potential savings due to savings from CFLs as these new standards will raise the baseline efficiency of lighting technologies, which can be met by new high efficiency incandescent lighting technologies. With such changes underway, what role will there be for residential lighting programs? How much savings can they achieve cost-effectively above such new standards? Similar questions arise for more stringent building codes and efficiency improvements achieved from programs funded and operated outside the realm of ratepayer-funded utilities and public benefits programs.

#### *Other Drivers of Demand Growth*

While utilities and non-utility program administrators are working ever harder to achieve energy savings through improved energy efficiency of existing customer appliances and energy-using technologies, customers are adding more and more new technologies into their homes, workplaces, and institutions. The burgeoning markets for consumer electronics creates new energy demands, as does the growing use of electric vehicles. Such demand can negate some of the gains made through energy efficiency programs targeting existing common customer applications, such as refrigerators, air conditioning, and lighting.

#### *Sustaining Savings*

Achieving annual savings of 1-2% of total sales in a single year is challenging. Relatively few states have achieved such savings levels to date. Sustaining such savings levels for multiple years is the new frontier for energy efficiency programs. The vast majority of energy efficiency potential studies for states and utilities suggest that such significant savings levels are possible. Vermont has achieved about 11% electricity savings over a decade (Efficiency Vermont 2012) and states such as California, Connecticut, Iowa, Massachusetts, Minnesota, and Washington have also achieved substantial savings over the past two decades. However, most states lack the experience with achieving and sustaining high levels of energy savings for many years.

## **CONCLUSIONS AND RECOMMENDATIONS: A NEW ERA OF ENERGY EFFICIENCY AS A RESOURCE**

The concept and practice of “energy efficiency as a resource” has come a long way in a relatively short time. While customer demand and use of electricity was once held to be outside the influence and concern of utilities, it is now common practice for utilities and related organizations to provide programs and services to their customers to manage

energy use and costs through improved energy efficiency and other demand-side management. The scope and magnitude of such efforts has risen and fallen over the past thirty or more years. However, since the late 1990s the overall trend for programs has been rapid growth and expansion. And since about 2005 this growth and expansion has greatly accelerated—resulting in unprecedented levels of spending on energy efficiency programs and corresponding energy savings from such efforts.

The success of energy efficiency programs in achieving energy savings at a fraction of supply costs has laid the groundwork for a new era of energy efficiency. Since energy efficiency has proven to be such a low cost energy resource, policies have been put in place to push the envelope as to how much of this low cost resource can be harvested through customer energy efficiency programs. The introduction and establishment of EERS has “raised the bar” for the role of such programs in the overall resource portfolios of utilities. Such targets, if met, will greatly reduce electricity consumption and overall demand growth. In a few states, there is even talk of not just slowing the rate of demand growth, but actually reducing overall electricity demand from current levels. In fact, in Vermont, they have achieved such “negative growth” in the past few years (Efficiency Vermont 2012). The environmental benefits of energy efficiency, especially as the most cost-effective option to reduce greenhouse gas emissions, are clearly another force behind these efforts although such non-energy benefits are not included in the kinds of cost-benefit analyses used to determine cost-effectiveness of programs. This failure to account for environmental and non-energy benefits of energy efficiency means that programs are not able to include certain measures and programs.

To meet these targets is challenging. It is clear that to do so will require innovative program design and delivery. The capabilities of new and emerging technologies will have to be fully developed and used. Programs must also broaden their efforts beyond a traditional approach towards changing technologies and markets to changing customer behavior as affects energy use. Changing the basic utility regulatory business model will become more important as programs strive for higher and higher savings. Including environmental benefits in screening energy efficiency measures will be important to allow programs to pursue “deep” savings through more integrated, comprehensive program approaches.

Against this backdrop of the recent, rapid growth of energy efficiency program spending in order to reach higher savings targets is the severe economic downturn that began in 2008 and the greatly changed political climate that occurred in the 2010 elections. The recession and conservative political shift may create pressure to roll back many of the recent increases in energy efficiency program spending and targets in some states. As state governments face deep deficits and unemployment remains high, some political and business leaders argue that we cannot afford the levels of energy efficiency program spending that have been achieved or are being implemented. However, reducing efficiency spending now likely means having to increase spending on new power plants later.

The record of achievement from utility and public benefits energy efficiency programs clearly demonstrates the real value of these programs. Energy efficiency remains the lowest cost resource available within energy portfolios. With its significant environmental benefits, it is clearly the preferred energy resource among all options. Over thirty years of experience with customer energy efficiency programs has laid an important foundation for a new era of such programs—an era that will be marked by innovation and expansion.



## REFERENCES

- [AGA] American Gas Association. 2011. *Natural Gas Efficiency Programs Report 2010 Program Year*. [http://www.aga.org/Kc/analyses-and-statistics/studies/efficiency\\_and\\_environment/Pages/Natural-Gas-Efficiency-Programs-Report-2010.aspx](http://www.aga.org/Kc/analyses-and-statistics/studies/efficiency_and_environment/Pages/Natural-Gas-Efficiency-Programs-Report-2010.aspx). Washington, DC: American Gas Association.
- Barbose, G, C. Goldman and J. Schlegel. 2009. *The Shifting Landscape of Ratepayer-Funded Energy Efficiency in the U.S.* <http://eetd.lbl.gov/EA/EMP/reports/lbni-2258e.pdf> Report LBNL-2258E. Berkeley, CA: Ernest Orlando Lawrence Berkeley National Laboratory.
- Cavanagh, Ralph. 1994. *The Great Retail Wheeling Illusion*. E Source, Strategic Issues Papers, March.
- Cavanagh, Ralph. 2009. Graphs, Words, and Deeds, Reflections on Commissioner Rosenfeld and California's Energy Efficiency Leadership, Innovations Case Discussion: The California Effect, Innovations, Volume 4, Issue 4.
- Chang, M., D. White, L. Johnston, and B. Biewald. 2010. *Benefits of RGGI Proceeds: An Initial Analysis*. October 5. <http://www.synapse-energy.com/Downloads/SynapseReport.2010-10.RAP.EE-Benefits-of-RGGI-Proceeds.10-027.pdf>. Synapse Energy Economics, Inc.
- Cooper, A. and L. Wood. 2012. *Summary of Rate-payer Funded Electricity Impacts, Budgets and Expenditures (2010-2011)*. [http://www.edisonfoundation.net/iee/Documents/IEE\\_CEE2011\\_FINAL\\_update.pdf](http://www.edisonfoundation.net/iee/Documents/IEE_CEE2011_FINAL_update.pdf). IEE Brief. Washington, DC. Institute for Electric Efficiency. January.
- [CEE] Consortium for Energy Efficiency. 2006. *U.S. Energy-Efficiency Programs: A \$2.6 Billion Industry*. [http://www.cee1.org/ee-pe/cee\\_budget\\_report.pdf](http://www.cee1.org/ee-pe/cee_budget_report.pdf). Consortium for Energy Efficiency.
- \_\_\_\_\_. 2007. *Energy Efficiency Programs: A \$3.7 Billion U.S. and Canadian Industry*. <http://www.cee1.org/ee-pe/2007/2007EEPReport.pdf>. Consortium for Energy Efficiency.
- \_\_\_\_\_. 2008. "Estimated 2007 U.S. Energy-Efficiency Budgets for Electric & Gas Programs by State and Sector." <http://www.cee1.org/ee-pe/2007/tables/Table1.pdf>. Consortium for Energy Efficiency.
- \_\_\_\_\_. 2009. *The State of the Efficiency Program Industry: 2009 Expenditures, Impacts and 2010 Budgets*. <http://www.cee1.org/files/StateofEEIndustry2009.pdf>. Consortium for Energy Efficiency.
- \_\_\_\_\_. 2012. *State of the Efficiency Program Industry: Budgets, Expenditures, and Impacts 2011*. <http://www.cee1.org/files/2011%20CEE%20Annual%20Industry%20Report.pdf>. Consortium for Energy Efficiency.
- \_\_\_\_\_. 2006-2011. *Annual Industry Reports, 2006–2011*. <http://www.cee1.org/ee-pe/AIRindex.php3>. Consortium for Energy Efficiency.

[EEI] Edison Electric Institute. 2002. *Catalog of Shareholder-Owned Electric Utilities*. Washington, DC: Edison Electric Institute.

Efficiency Vermont. 2012. 2011 Savings Claim. [http://www.encyvermont.com/docs/about\\_efficiency\\_vermont/annual\\_reports/2011\\_Savings\\_Claim\\_Summary\\_EfficiencyVermont.pdf](http://www.encyvermont.com/docs/about_efficiency_vermont/annual_reports/2011_Savings_Claim_Summary_EfficiencyVermont.pdf). Efficiency Vermont .

Ehrhardt-Martinez, Karen, Kat A. Donnelly, and John A. “Skip” Laitner. 2010. *Advanced Metering Initiatives and Residential Feedback Programs: A Meta-Review for Household Electricity-Saving Opportunities*. <http://www.aceee.org/research-report/e105>. Washington, DC: American Council for an Energy-Efficient Economy.

[EIA] Energy Information Administration. 1995. *U.S. Electric Utility Demand-Side Management 1993*. Washington, DC: U.S. Department of Energy, Energy Information Administration.

\_\_\_\_\_. 1999. *U.S. Electric Utility Demand-Side Management 1998*. Washington, DC: U.S. Department of Energy, Energy Information Administration.

\_\_\_\_\_. 2005. *Annual Electric Utility Data: EIA 861 Data File for 2004*. <http://www.eia.doe.gov/cneaf/electricity/page/eia861.html>. Washington, DC: U.S. Department of Energy, Energy Information Administration.

\_\_\_\_\_. 2000-2011. “Annual Electric Utility Data — EIA-861 Data File.” *Official Energy Statistics from the U.S. Government*. <http://www.eia.doe.gov/cneaf/electricity/page/eia861.html>. Washington, DC: U.S. Department of Energy, Energy Information Administration.

Eldridge, Maggie, Bill Prindle, Dan York, and Steve Nadel. 2007. *The State Energy Efficiency Scorecard for 2006*. Washington, DC: American Council for an Energy-Efficient Economy.

Eldridge, M., M. Neubauer, D. York, S. Vaidyanathan, A. Chittum and S. Nadel. 2008. *2008 State Energy Efficiency Scorecard*. <http://aceee.org/pubs/e086.htm>. Washington, DC: American Council for an Energy-Efficient Economy.

Eldridge, Maggie, Michael Sciortino, Laura Furrey, Seth Nowak, Shruti Vaidyanathan, Max Neubauer, Nate Kaufman, Anna Chittum, Sarah Black, Colin Sheppard, Charles Chamberlin, Arne Jacobson, Yerina Mugica, and Dale Bryk. 2009. *The 2009 State Energy Efficiency Scorecard Report*. Washington, DC: American Council for an Energy-Efficient Economy.

Friedrich, Katherine, Maggie Eldridge, Dan York, Patti Witte, and Marty Kushler. 2009. *Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved Through Utility-Sector Energy Efficiency Programs*. <http://www.aceee.org/research-report/U092>. Washington, DC: American Council for an Energy-Efficient Economy.

Friedrich, Katherine, Jennifer Amann, Shruti Vaidyanathan, and R. Neal Elliott. 2010. *Visible and Concrete Savings: Case Studies of Effective Behavioral Approaches to Improving Customer Energy Efficiency*. <http://www.aceee.org/research-report/e108>. Washington, DC: American Council for an Energy-Efficient Economy.

- Goldman, Charles. Merrian C. Fuller, Elizabeth Stuart, Jane S. Peters, Marjorie McRae, Nathaniel Albers, Susan Lutzenhiser and Merisha Spahic. 2010. *Energy Efficiency Services Sector: Workforce Size and Expectations for Growth*. LBNL-3987E. Berkeley, CA: Lawrence Berkeley National Laboratory.
- Hayes, Sara, Steven Nadel, Martin Kushler, and Dan York. 2011a. *Balancing Interests: A Review of Lost-Revenue Adjustment Mechanisms for Utility Energy Efficiency Programs*. <http://www.aceee.org/research-report/U114>. Washington, DC: American Council for an Energy-Efficient Economy.
- . 2011b. *Carrots for Utilities: Providing Financial Returns for Utility Investment in Energy Efficiency*. <http://www.aceee.org/research-report/U111>. Washington, DC: American Council for an Energy-Efficient Economy.
- Kushler, Martin and Edward Vine. 2003. *Examining California's Energy Efficiency Policy Response to the 2000/2001 Electricity Crisis: Practical Lessons Learned Regarding Policies, Administration, and Implementation*. <http://www.aceee.org/research-report/U033>. Washington, DC: American Council for an Energy-Efficient Economy.
- Kushler, M. and P. Witte. 2001. *Can We Just "Rely on the Market" to Provide Energy Efficiency?* Washington, DC: American Council for an Energy-Efficient Economy.
- Kushler, M, D. York and P. Witte. 2004. *Five Years In: An Examination of the First Half-Decade of Public Benefits Energy Efficiency Policies*. <http://aceee.org/research-report/u042>. Washington, DC: American Council for an Energy-Efficient Economy.
- . 2009. *Meeting Aggressive New State Goals for Utility-Sector Energy Efficiency: Examining Key Factors Associated with High Savings*. <http://www.aceee.org/research-report/U091>. Washington, DC: American Council for an Energy-Efficient Economy.
- Kushler, Martin, Seth Nowak and Patti Witte. 2012. *A National Survey of State Policies and Practices for the Evaluation of Ratepayer-Funded Energy Efficiency Programs*. <http://aceee.org/research-report/u122>. Washington, DC: American Council for an Energy-Efficient Economy.
- Molina, Maggie, M. Neubauer, M. Sciortino, S. Nowak, S. Vaidyanatham, N. Kaufman, and A. Chittum. 2010. *The 2010 State Energy Efficiency Scorecard*. <http://www.aceee.org/research-report/e107>. Washington, DC: American Council for an Energy-Efficient Economy
- Nadel, Steven, Toru Kubo and Howard Geller. 2000. *State Scorecard on Utility Energy Efficiency Programs*. Washington, DC: American Council for an Energy-Efficient Economy.
- Neme, C. and R. Sedano. 2012. *US Experience with Efficiency As a Transmission and Distribution System Resource*. <http://www.raponline.org/document/download/id/4765>. Regulatory Assistance Project.
- [NPPC] Northwest Power and Conservation Council. 2005. *The Fifth Northwest Electric Power and Conservation Plan*. <http://www.nwcouncil.org/energy/powerplan/5/Default.htm>. Northwest Power and Conservation Council.

Nowak, Seth, Martin Kushler, Michael Sciortino, Dan York, and Patti Witte. 2011. *Energy Efficiency Resource Standards: State and Utility Strategies for Higher Energy Savings*. Washington, DC: American Council for an Energy-Efficient Economy.

Prindle, William, N. Dietsch, R.N. Elliott, M. Kushler, T. Langer, and S. Nadel. 2003. *Energy Efficiency's Next Generation: Innovation at the State Level*. Washington, DC: American Council for an Energy-Efficient Economy.

[RAP] The Regulatory Assistance Project. 2011a. *Electricity Regulation in the U.S. A Guide*. <http://www.raponline.org/document/download/id/645>. Montpelier, Vermont: The Regulatory Assistance Project.

———. 2011b. *Revenue Regulation and Decoupling: A Guide to Theory and Application*. <http://www.raponline.org/document/download/id/902>. Montpelier, Vermont: The Regulatory Assistance Project.

Sciortino, Michael, S. Nowak, P. Witte, D. York, and M. Kushler. 2011. *Energy Efficiency Resource Standards: A Progress Report on State Experience*. Washington DC: American Council for an Energy-Efficient Economy.

Sciortino, Michael, Max Neubauer, Shruti Vaidyanathan, Anna Chittum, Sara Hayes, Seth Nowak, and Maggie Molina. 2011. *The 2011 State Energy Efficiency Scorecard*. <http://www.aceee.org/research-report/E115>. Washington DC: American Council for an Energy-Efficient Economy.

[WGA] Western Governors Association. 2005. *Clean and Diversified Energy Initiative: Energy Efficiency Task Force Report*. Western Governors Association.

York, D. and M. Kushler. 2002. *State Scorecard on Utility and Public Benefits Energy Efficiency Programs: An Update*. Washington, DC: American Council for an Energy-Efficient Economy.

———. 2005. *ACEEE's 3<sup>rd</sup> National Scorecard on Utility and Public Benefits Energy Efficiency Programs: A National Review and Update of State-Level Activity* <http://www.aceee.org/research-report/u054.pdf>. Washington, DC: American Council for an Energy-Efficient Economy.

. 2006. "A Nationwide Assessment of Utility Sector Energy Efficiency Spending, Savings, and Integration with Utility System Resource Acquisition." In *Proceedings of the ACEEE 2006 Summer Study on Energy Efficiency in Buildings*. Washington, DC: American Council for an Energy-Efficient Economy.

———. 2011. *The Old Model Isn't Working: Creating the Energy Utility for the 21<sup>st</sup> Century*. [http://www.aceee.org/files/pdf/white-paper/The\\_Old\\_Model\\_Isnt\\_Working.pdf](http://www.aceee.org/files/pdf/white-paper/The_Old_Model_Isnt_Working.pdf) Washington, DC: American Council for an Energy-Efficient Economy.